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American Veterinary Medical Association

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VETERINARY STUDENT ENROLLMENT FOR 1931-1932

In all probability there has never been a time when as much interest was shown in veterinary student enrollment as is the case this fall. Undoubtedly there are quite a number of reasons for this deep interest. One of these is the report of the Committee on Education, presented at the Kansas City convention and published in this issue of the Journal. Another reason is the increase in matriculation requirements put into effect at Iowa State College this year and similar increases predicted for other institutions next year.

It requires only a glance at the figures showing the total veterinary student enrollment, this year, to be convinced that any imminent danger of a shortage of veterinarians probably does not exist. Roughly speaking, our veterinary colleges, during the past ten years or so, have been graduating approximately one-half of the number of veterinarians which, it is estimated, will be required to maintain the strength of the veterinary profession in the United States at its present numerical level. The estimated number required is 296 per year, against an average yearly output of 152 for the period from 1921 to 1931.

A little investigation shows that, of the students who start the veterinary course, about 83 per cent actually are graduated at

the end of four years. This means that on the average one student out of six drops out, for one reason or another, and fails to finish the course. This average is fairly constant. This year, there are 453 freshmen veterinary students enrolled in the thirteen colleges in the United States and Canada. We can expect that about 75 of these will not complete the course. Of this basis, the theoretical number of veterinary graduates for 1935 is 378, or about 82 more than the number estimated as necessary to maintain the present level.

There are a number of factors which would necessitate corrections in these computations, one of which is the fact that student enrollment in the two Canadian colleges is taken into consideration in figuring the number of prospective graduates for 1935, whereas the theoretical number of new veterinarians required annually is for the United States alone. However, against this we are confronted with the fact that a considerable number of the graduates of the Ontario Veterinary College locate in the United States.

There are 388 sophomore students enrolled, this year, in the thirteen colleges, and it is quite likely that between 325 and 350 will be graduated in 1934. This means that we will reach, and exceed, the theoretical annual requirement that year. As a matter of fact, with 270 juniors and 267 seniors enrolled this year, the number will be closely approached in both 1932 and 1933. It should be kept in mind that the estimated requirements of the profession are for replacements only, and no allowance has been made for the extension of veterinary activities into new fields, with the consequent demands for additional veterinarians.

Comparing the enrollment this year with one year ago, we find that there is a net increase of 172 students. This number includes those enrolled in the regular four-year course, as well as others enrolled in special courses and for graduate study. This is not the greatest increase during recent years, as the enrollment in the fall of 1928 showed an increase of 173 over 1927.

The increased entrance requirements at Iowa State College may or may not have had an effect on the total freshman enrollment this fall. As far as the institution at Ames is concerned, the increased requirements had a very noticeable effect, reflected in the small number of first-year students, seventeen, against ninety-two last year. However, Dean Stange reports that there are thirty-four pre-veterinary students enrolled in the Division of Industrial Science and approximately twenty-five students

enrolled in other colleges for pre-veterinary work. These fifty-nine students do not appear in the figures given in the table, but it is presumed that most of them will be enrolled as regular veterinary students next year.

At this time it is not possible to tell how many prospective veterinary students at Iowa State College decided to enter other institutions, rather than spend an extra year in pre-veterinary studies at Ames. It is this fact that makes it difficult to state accurately what effect, if any, the increased requirements at Ames may have had on the total freshman enrollment. Colorado has fourteen more freshmen than one year ago. Kansas has fifteen more, Michigan eighteen and Ohio seventeen.

As far as veterinary education in this country as a whole is concerned, very little will be gained by one, two or three colleges increasing their entrance requirements and the balance lagging behind. We passed through just such a situation a little over a decade ago. If a prospective student is turned down by one college, as lacking sufficient entrance credits, but is taken in by another institution with lower standards, very little is gained as far as veterinary education as a whole is concerned.

Our veterinary colleges practically have it within their power to regulate the number of veterinary graduates, if they will act in unison. The law of supply and demand has not been repealed and will continue to operate. However, necessary corrections in the supply normally lag behind, if demand is the only regulating factor. We now have at our command the statistics compiled by the Committee on Education, bearing on the number of veterinarians, their distribution, and so forth. Now, for the first time, we have a fairly accurate yard-stick for measuring the veterinary requirements of the country. Men can be lost by the veterinary profession much more rapidly than they can be gained. Even so, it is extremely improbable that there will be any sudden change in conditions that would result in a sudden shortage in the number of veterinarians available.

It has taken seven years to bring the number of veterinary students from its lowest point to the present figure. Making veterinarians is not like most manufacturing processes, where it is merely a question of going into the market, buying raw materials and converting them into the finished product in a few days or weeks at the most. It now takes four or five years to turn out a veterinarian. Unless steps are taken to keep the number of veterinary students within reasonable limits, we may

easily have a surplus of veterinarians before we know it. All agree that this would be an unhealthy condition. By raising or lowering entrance requirements, the number of veterinary students can be decreased or increased, as conditions warrant. Of course we do not like to think of lowering entrance requirements once they have been raised, but even this contingency can be avoided by the intelligent application of artificial regulation in the form of properly adjusting entrance requirements from time to time.

Although the number of veterinarians taking graduate work this year is the largest on record, the number is still considerably less that should be the case. When we consider that there are approximately 10,000 graduate veterinarians in this country and only 30 of them are taking postgraduate work, the number seems ridiculously small. Perhaps this is only another condition that will be corrected indirectly. It can hardly be stated truthfully that there is no demand for veterinarians possessing advanced training. As a matter of fact, other things being equal, the veterinarian with an advanced degree has a distinct advantage over his colleague not possessing such a degree, when both are candidates for a position. On the other hand, the criticism is frequently heard to the effect that the salaries which go with most veterinary positions hardly warrant a man spending very much time pursuing postgraduate work. This is one of the things that all of us hope to see corrected.

Veterinary student enrollment for the college year 1931-32

	Fr.	Soph.	Jun.	Sen.	Spec.	Grad.	Total	1930–31	Change
Alabama P. I.	19	17	10	10	2	0	58	42	+16
Colorado A.C.	43	34	27	30	0	0	134	103	+31
Cornell Univ.	70	57	24	42	1	10	204	163	+41
Georgia S. C.	13	7	9	12	0	0	41	47	−6
Iowa State Col.	17*	77	41	38	0	6	179	233	−54
Kansas S. C.	56	41	40	22	6	0	165	126	+39
Michigan S. C.	32	13	13	9	0	3	70	52	+18
Montreal, Univ. of	12	12	8	2	0	0	34	25	+9
Ohio State U.	65	40	34	30	0	10	179	149	+30
Ontario V. C.	42	32	18	23	0	0	115	99	+16
Penna., Univ. of	47	36	26	25	0	0	134	113	+21
Texas A. & M. C.	11	7	6	7	1	0	32	25	+7
Washington, S. C. of	26	15	14	17	0	1	73	69	+4
Totals	453	388	270	267	10	30	1418	1246	+172

*Dean Stange reports 34 pre-veterinary students enrolled in the Division of Industrial Science and approximately 25 others enrolled in other colleges for pre- veterinary work.

HOSTILITIES CONTINUED

Judging from reports, the rebellion in Iowa did not come to an end with the calling out of National Guardsmen, the latter part of September. As a matter of fact, by October 2, the battlefront extended into four counties, Cedar, Des Moines, Keokuk and Lee, all in the southeastern part of the State, where the objectors had banded themselves together into a so-called "Protective Association," organized for the purpose of interfering with the Iowa law, which makes the tuberculin testing of cattle compulsory.

As usual, the same old threadbare excuses were offered for opposing the test, namely that tuberculin causes abortion in cows, that it fails to pick out all infected animals and that it occasionally causes a reaction in an apparently non-infected animal. To these was added the argument that the test is designed by unscrupulous politicians and financial interests who desire to confiscate the property of small farmers.

Some local color was given to the situation, as it existed in the vicinity of Tipton, Iowa, by the press reports directing attention to the fact that the embattled farmers were arrayed against 1800 Iowa National Guardsmen in the county in which President Hoover was born. It is reported that leaders of the opposition were using the radio for broadcasting their reasons for opposing the test. Another report stated that the principal varieties of ammunition used by the objectors were pitchforks, mud and eggs of ancient vintage.

Seven hundred members of the Farmers' Protective Association met at Mount Pleasant, the latter part of September, and passed a resolution, to be transmitted to Governor Turner, declaring that unless he ordered the immediate withdrawal of troops from Cedar County, the farmers would refuse to pay their taxes for either 1931 or 1932.

One of the best editorials that we have seen was in the Port Huron (Mich.) *Times-Herald*. This editorial contains so much good common sense that we are reproducing it in full.

> Among Michigan farmers, who have seen bovine tuberculosis almost completely stamped out in the State during the last three or four years by the operations of the compulsory tuberculin test, it is difficult to appreciate the rebellious opposition to this test by a large group of farmers down in Iowa, which has made it necessary to call out National Guardsmen for the protection of veterinarians in the enforcement of the law.
>
> The tuberculin test is not a cure, to be sure, but it discloses the presence of the disease, so that the affected cattle can be destroyed.
>
> The value and effectiveness of the test would seem to have been well demonstrated in Michigan, which is now almost free of this disease in its

dairy cattle, and is by way of being greatly benefited by the resulting improvement of the quality and value of its live stock.

There have been, to be sure, stray groups of farmers who have opposed the test, largely under the influence of radical agitators from outside the State.

But the test has gone over the State, and one can be reasonably sure in Michigan that the milk and other dairy products he uses are free from the possibility of contamination from that source.

In Iowa the full authority of the State is being used to put through the test, which the state law makes compulsory.

In the end, the State and each individual farmer will be benefited, and probably without exception even the farmers who are now in violent rebellion against the test will be glad to have it made.

About 90 per cent of the success of tuberculosis eradication rests upon the proper education of those owning the cattle to be tested. If the cattle-owners are properly approached and if they are shown the economic benefits to be derived from having a herd of cattle free from the disease, no further argument in favor of testing should be needed. Even the question of public health does not have to be brought into the matter. In other words, the eradication of tuberculosis from animals can be made to stand on its own feet.

Unfortunately, however, a few spell-binders have seen an opportunity to secure jobs for themselves, by organizing farmers to oppose the test. These culprits have gone about among farmers in different parts of the country and, by preaching false gospel, have converted them to the idea that there was something wrong with tuberculosis eradication and tuberculin testing. Practically without exception, where both sides have been given opportunities to present their cases, the cattle-owners have been won over, and the work has been allowed to progress, after more or less delay. Strenuous measures have been necessary, in a few isolated instances, to get the cattle tested.

Some have expressed the opinion that the showing of a stiff front earlier in the game, upon the part of the State higher-ups, would have prevented a large part of the disgraceful activities upon the part of a few hundred misinformed Iowa farmers, during the past two months, and that it would not have been necessary to resort to injunctions to restrain these farmers from breaking the law, a really ridiculous situation. However, this may be a matter of opinion. One of the regrettable features of the whole business is that it has afforded a wonderful opportunity for wise-cracking upon the part of newspaper columnists and radio broadcasters, at the expense of veterinarians and tuberculosis eradication.

CORRECTING A MISSTATEMENT

A five-line note in the October issue of the JOURNAL did a rank injustice to Dr. W. H. Welch, Chief Veterinarian, Division of Animal Industry, Illinois Department of Agriculture, in stating that Dr. Welch had made a ruling to the effect that members of 4-H Clubs might vaccinate their own pigs and that certificates of such vaccination would be accepted in lieu of health certificates, issued by licensed veterinarians, in connection with exhibiting pigs at the Illinois State Fair.

In fairness to Dr. Welch we wish to state that he did *not* make this ruling. It was made by the Illinois Department of Agriculture, which body exercises the rights, powers and duties vested by most states in their state veterinarians. Technically Illinois has no state veterinarian. Dr. Welch, in his official capacity, merely made public the above ruling, when a member of one of the 4-H Clubs raised the question. Considerable prominence was given the ruling in the rural press throughout the State.

While on this subject it might be timely to point out that in Illinois the law gives the Chief Veterinarian just about as much authority as a minor clerk. Even in matters of disease control he is exceeded in authority by two laymen, the Director of Agriculture and the Superintendent of Animal Husbandry. Dr. Welch has tried unsuccessfully to have the objectionable ruling rescinded. We understand that his predecessor in office also fought it, but to no avail.

The Illinois Department of Agriculture adopts and promulgates the rules and regulations governing the State Fair. The Department prescribes the kinds and classes of exhibits, as well as the *conditions under which they shall be received, installed and cared for.* From these few facts it will be seen that even in matters of disease control the office of Chief Veterinarian in Illinois is a rather empty honor. The veterinarians in Illinois are not to blame for this state of affairs. They have realized the dangers of such a situation and have called them to the attention of those in authority. Rather the responsibility rests upon the good people of Illinois who have tacitly permitted this condition to exist. In the end, the farmers and stockmen, those who have their capital invested in live stock, are the ones who stand to lose when not protected by up-to-date, sensible rules and regulations, made by those who have made it their business to know what is best in live stock sanitation.

APPLICATIONS FOR MEMBERSHIP

FIRST LISTING

(See July, 1931, JOURNAL)

CHRISTOPHER, W. F. LaPorte City, Iowa
M. D. C., Chicago Veterinary College, 1910
Vouchers: J. C. Glenn and C. B. Strain.

GANDY, MARSHALL H. 1810 Cherokee Ave., Baton Rouge, La.
D. V. M., Kansas City Veterinary College, 1916
Vouchers: Harry Morris and E. P. Flower.

HOFFMAN, ROY D. 343 York St., Gettysburg, Pa.
V. M. D., University of Pennsylvania, 1931
Vouchers: G. A. Dick and E. L. Stubbs.

JACKSON, R. W. Bureau of Animal Industry, Trenton, N. J.
D. V. M., Kansas State College, 1930
Vouchers: W. F. Harrison and Edwin J. Frick.

MENARY, A. R. 1721 Blake Blvd., Cedar Rapids, Iowa
D. V. M., Iowa State College, 1910
Vouchers: Grant B. Munger and John B. Bryant.

Applications Pending

SECOND LISTING

(See October, 1931, JOURNAL)

Bowker, George W., Rolla, Mo.
Clark, Lawrence G., 3712 Beverly Blvd., Los Angeles, Calif.
Evans, Alexander R., Jr., 135 Cricket Ave., Ardmore, Pa.
Higgins, William A., Box 68, North End Station, Detroit, Mich.
Hill, Anson H., Rapid City, S. Dak.
Jelden, Edward J., Columbus, Nebr.
Leonpacher, Louis, Lafayette, Ind.
Martinaglia, Giovanni, Box 1620, Johannesburg, Transvaal, South Africa.
Rainey, Daniel W., 1102 State Office Bldg., Richmond, Va.
Trefzer, Armin C., 3002 Brooklyn Ave., Kansas City, Mo.
Ziebarth, John A., Jr., R. 1, Pocatello, Idaho.

COMING VETERINARY MEETINGS

Connecticut Veterinary Medical Association. New Haven, Conn. November 4, 1931. Dr. Edwin Laitinen, Secretary, 993 N. Main St., West Hartford, Conn.

San Diego-Imperial Veterinary Medical Association. San Diego, Calif. November 4, 1931. Dr. A. P. Immenschuh, Secretary, Santee, Calif.

New England Veterinary Medical Association. Boston, Mass. November 9-10, 1931. Dr. H. W. Jakeman, Secretary, 44 Bromfield St., Boston, Mass.

Southern States Veterinary Medical Association. Atlanta, Ga. November 9-10, 1931. Dr. M. R. Blackstock, Secretary, 157 W. Hampton Ave., Spartanburg, S. C.

Purdue University, Veterinary Short Course. Purdue University, Lafayette, Ind., November 9-11, 1931. Dr. R. A. Craig, Department of Veterinary Science, Purdue University, Lafayette, Ind.

Chicago Veterinary Medical Association. Atlantic Hotel, Chicago, Ill. November 10, 1931. Dr. E. E. Sweebe, Secretary, 14th St. & Sheridan Road, North Chicago, Ill.

Kansas City Association of Veterinarians. Baltimore Hotel, Kansas City, Mo. November 10, 1931. Dr. J. D. Ray, Secretary, 1103 E. 47th St., Kansas City, Mo.

Tulsa County Veterinary Association. Tulsa, Okla. November 12, 1931. Dr. J. M. Higgins, Secretary, 3305 E. 11th St., Tulsa, Okla.

Hudson Valley Veterinary Medical Society. Poughkeepsie, N. Y. November 18, 1931. Dr. J. G. Wills, Secretary, Box 751, Albany, N. Y.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. November 18, 1931. Dr. E. E. Jones, Secretary, 1451 Mirasol St., Los Angeles, Calif.

Michigan-Ohio Veterinary Medical Association. Adrian, Mich. November 19, 1931. Dr. E. C. W. Schubel, Secretary, Blissfield, Mich.

Keystone Veterinary Medical Association. Philadelphia, Pa. November 25, 1931. Dr. C. S. Rockwell, Secretary, 5225 Spruce St., Philadelphia, Pa.

New York City, Veterinary Medical Association of. Academy of Medicine, 5th Ave. and 103rd St., New York, N. Y. December 2, 1931. Dr. John E. Crawford, Secretary, 708 Beach 19th St., Far Rockaway, Long Island, N. Y.

U. S. Live Stock Sanitary Association. LaSalle Hotel, Chicago, Ill. December 2-4, 1931. Dr. O. E. Dyson, Secretary, 45 Live Stock Exchange Bldg., Wichita, Kans.

Nebraska State Veterinary Medical Association. Hotel Rome, Omaha, Nebr. December 8-9, 1931. Dr. E. C. Jones, Secretary, Platte Valley Serum Co., Grand Island, Nebr.

New Mexico Veterinary Medical Association. Albuquerque. New Mexico. December 11, 1931. Dr. F. H. Barr, Secretary-Treasurer, 112 S. Broadway, Albuquerque, New Mexico.

STATE BOARD EXAMINATION

Nebraska State Board of Veterinary Examiners. Capitol Bldg., Lincoln Nebr. November 9-10, 1931. Dr. F. R. Woodring, Secretary, Capitol Bldg., Lincoln, Nebr.

THE VETERINARY HOSPITAL

With Special Reference to Accommodations for Small Animals

By HORST SCHRECK, *El Paso, Texas*

(*Continued from page 348, September issue*)

THE DRUG STATION IN THE WARD

The ward drug station should have on its shelves those drugs that have a likely use in that particular ward. In addition to the wash-bowl, with hot and cold water connections, there should be provision for an ample supply of small towels and clean coats. Underneath the shelf, closet room should be provided for a waste receptacle and a wire basket for soiled towels. Provision also should be made for a hose connection. (See figure 26.) Floor and wall space must be provided for all of these appointments in planning the ward. If we so desire, we may, on some intervening wall space, provide room for janitor equipment (shovel, broom, feces forceps, etc.), and if the ward floor is such that it can be hosed, it may be well for each ward to have its own hose. By this arrangement, spreading of infection is curtailed to the minimum. The hose would have its source at the drug station, and carry either hot or cold water.

THE SURGICAL WARD

The surgical ward is smaller than the general ward. It should be removed as far as possible from the reception-room, but should be close to, or in direct contact with, the surgery. All kennel floors in this ward should be at table height, and no double-decking should be done. The door leading into the ward should be of ample size, so as to permit carrying of large patients through it. The proportion of large to small kennels should be in favor of the large kennel. This ward should be well soundproofed to hold the whining and yapping of recovery cases within its confines. Ample facilities should be provided for a clean-up of the attendant, both before and after attention to these patients. In the drug station we should find a few drugs, cotton and bandages, and hypodermic medicaments. Separate janitor equipment is advisable in every ward.

CLIPPING MACHINES
CLIPPING TABLE
CAST IRON TOP
FLOOR OPEN
MAIN-DRAIN
CRUET
SKIN-DISEASE WARD

FIG. 27.

SECTION
ELEVATION
KENNEL
KENNEL
DRUG-STATION
PLAN

FIG. 26.

The Observation Ward

The observation ward will prove a valuable adjunct in a large hospital and should be in direct contact with the examining room. No further provision therein is necessary, other than to equip the place in such a manner as to encourage and facilitate frequent and thorough cleaning.

The Distemper Ward

Let us remove the distemper ward as far away from public circulation as possible. Let it be in direct contact with an alley exit to lighten the burden of carcass disposal. The ratio of large to small kennels should be the same as in the general ward. It should by all means have its own drug station, with a small refrigerator added to take proper care of biologics used in that room. Janitor equipment of this ward should under no circumstances ever be carried to other parts of the hospital.

Where a hospital is large enough to have a goodly number of pneumonia cases, they should be isolated. There should be an ample supply of good daylight and a maximum amount of fresh air. Two or three specially constructed, oxygen-treatment, pneumonia kennels should supplement a number of typical kennels, the latter housing recuperative cases. If this ward must be consolidated, it is best brought within the distemper ward.

The Skin Disease Ward

The dermatitic ward also is placed away from public circulation, for what veterinarian wants to tell the public that he has mangy dogs in his place? It should be equipped with kennels or stalls designed for this purpose and have a good supply of natural light. If possible, an outside entrance should be provided, so dogs may be led direct to the open, without passing through the hospital to leave their trail of infected exfoliated skin and falling hair. Here, as in other wards, it is very essential that infection be kept to its confines. Mangy dogs need clipping, so why not have a mange ward with clipping and bathing facilities? (See figure 27.)

The Maternity Ward

The chief requisites of the maternity ward are sound insulation, good air and roominess. The best kennels are of the standard type, with provision for roller-curtain attachment over the door. A small drug station (merely a shelf) and a work-table for

periodic examination of whelping bitches may well be added if one cares to go to the point of having a special ward for these cases.

The Cat Ward

The cat ward requires good sound-insulation, a superabundance of daylight, with exposure to the south, if possible, and good heating facilities. Kennels in this ward are of the small size (2′ x 2′ by 6′ x 2′8″). They are advantageously used in alternation with puppies. Double-decking is very practical in cat cages. Some arrangement must be made to give boarders or long-time patients opportunity for free exercise in a larger pen. A small shelf will take care of the drug needs in most cases.

Boarding Kennels

The boarding kennels should, if possible, be altogether a separate unit from the hospital proper. This may be accomplished by complete isolation in a separate building, or placing these kennels in the basement, especially in a hillside hospital, or on an upper floor, with access to runs on a roof-garden. In addition to outside runs it is well to include a pull-pen for exercising dogs during clean-up in inclement weather. A place for guinea pigs, rabbits and other laboratory animals can usually be found in some unoccupied space, unless there should be a large number of this class of patients, in which case special provision should be made for their care.

The Examining-Room and Dispensing Pharmacy

We now come to a consideration of the second of the productive units. The function of the examining-room, as the name implies, is to supply the hospital with a place where the incoming animals may be given an exhaustive examination. The findings of these examinations may have to be complemented with or corroborated by a laboratory or x-ray examination. In consequence, these components should, if possible, be in close proximity to, or in direct contact with, the examining-room. It is here in the examining-room where the veterinarian comes in direct contact with his client and, in nine cases out of ten, it is here where a final decision is reached as to the dog's condition, and his future status as an inmate of the hospital or an out-patient. If he becomes a patient with a concluded diagnosis, he is prescribed for and usually some medication is administered at once, or the

client's prescription filled. All this should convince us that the examining-room is a very important unit or combination of units. Contrary to the wards, it can be combined with other units, such as the surgery, work-room or office. If large enough, even the transient kennels may be included therein. There is no question that much of the client's first impression of the hospital is formed here, and rightly so. In consequence, we should make every effort to enhance the favorable impression we are trying to create in the client's mind, with every possible material influence at our disposal. As every client will at one time or another visit our examining-room, we should not leave one stone unturned to gain our point. Therefore, excellence of planning, excellence of equipment, first-class illumination, both natural and artificial, and superabundance of ventilation are highly desirable. It becomes evident, then, that we will be compelled to spend some money. But it will be an excellent investment, bringing good returns in good will and repeat business.

Again, here as elsewhere, the room size must be a result of an arrangement and not the arrangement a result of the room size, except under absolutely unavoidable circumstances. The equipment of the examining-room naturally varies with different veterinarians, just as their procedures of examination and treatment differ. A few fundamental items, however, will be found in all examining-rooms. These are:

The examining-table.
Wash-sink or basin.
Instrument-case.
Drug-shelf with lockers, or a sectional concealed shelving arrangement.
Irrigation paraphernalia.
Restraint material.

Beyond these absolute essentials we find that other equipment may be installed, according to the individual veterinarian's desires. Additional equipment may include such items as a complete drug and sundry supply (not storage); a minor laboratory, with a microscope; a display of pathological specimens; a desk and cash register space; the transient kennels, and a janitor's closet.

The free space must be large enough to give standing room to the veterinarian and his assistant, the owner of the patient and at least two of his relatives. The large window should preferably

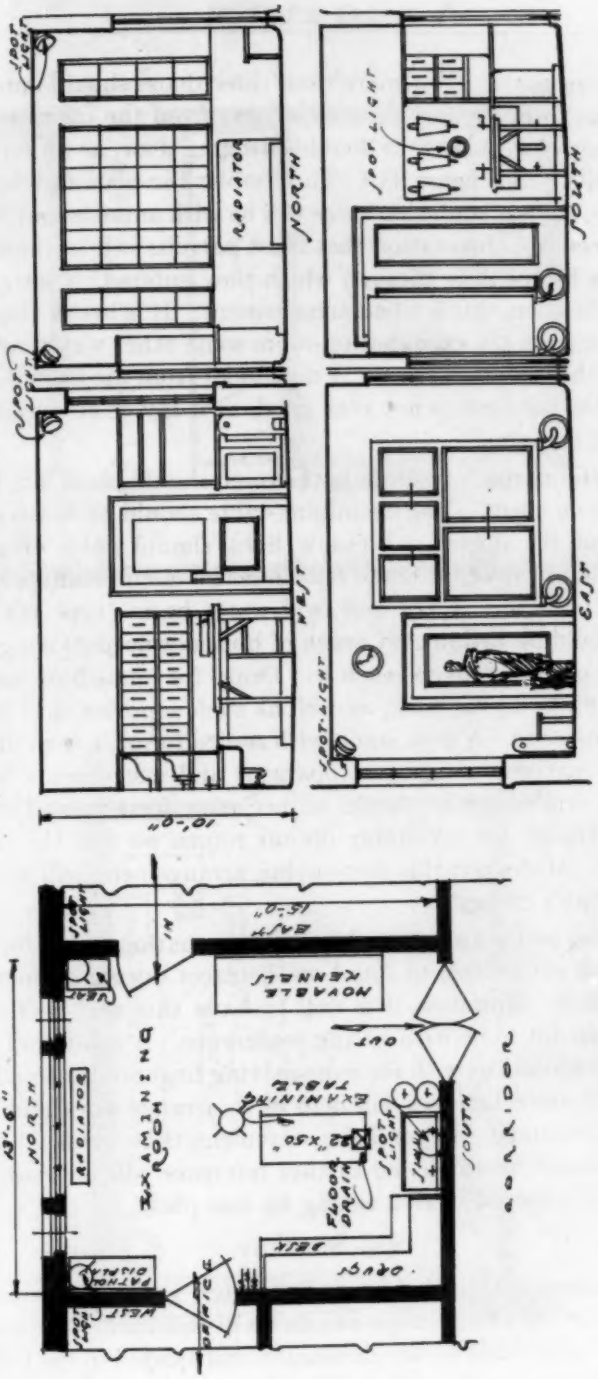

FIG. 28. EXAMINING ROOM

face east or north. Not more than three doors should enter this room, one from the reception-room, one from the office and one from a corridor, through a double-swinging door, as an outlet to other units. (See figure 28.) The simpler the plan and arrangement are, the less confusion there will be with animals and clients. It has been my observation that most patrons will try and leave the room by the door through which they entered. Contrary to their inclination, this is a bad arrangement. It is better that they make exit from the examination-room some other way than back through the reception-room. A direct exit from the examination-room to the outdoors is not very good, as it favors the occasional escape of an animal.

The veterinarian's position in the room should place him facing the entering client. The examining-table should be between the client and the doctor. Window light should enter from the doctor's left or over his back; but under no circumstances should he face the light. A hot and cold water basin (type taken up later) should be within easy reach of him, not necessitating more than one or two steps to reach it. Drugs for immediate medication should be at his back, as well as such sundries that he will need to dispense. A desk stand with record forms, a cash drawer, restraint material, irrigation apparatus and instruments should all be at arm's length. Avoid all necessity for going after any of these things, for invariably on our return we find the dog on the floor. Moreover, this step-saving arrangement will save the veterinarian's energy.

A folding seat is an essential in the examination-room, for some clients will not be able to stand on their feet during a protracted examination. However, it is well to have this seat well out of sight, so as not to invite a sitting conference. A good wall clock in sight confronts us with the ever-moving finger of time and time records on animal entries will help us to arrange work and hours to best advantage. Beyond the statement that artificial illumination should be ample, no further reference will be made concerning it, a special section taking up this phase.

The Surgery

The surgery is the third producing unit. Light and sanitation facilities are the two primary requisites of this unit. The surgery should be away from public circulation and located in the building with reference to the accessability to the surgical and general wards, as well as the source of daylight. It should contain

FIG. 30.

DOG-BATHING FACILITIES, PORTLAND CAT-HOSPITAL, PORTLAND, ORE.

FIG. 29.

nothing more than the operating-table, the sterilizing apparatus, an instrument-case, the anesthetizing apparatus, a film-viewing cabinet, a wash-basin of suitable type and such few drugs and sundries as are absolutely essential for efficient performance of the work. The window should be large and the artificial illumination a credit to the surgery. A special wainscote of hard cement plaster, vitrified tile or glazed brick should be carried to five feet in height. (See figure 29.)

Clipping and Bathing Facilities

The fourth of the producing units for clipping and bathing cats and dogs, though not strictly a veterinary operation, seems to have a firm root as a veterinary activity. In certain sections of the country this class of work is done by others, but where it has fallen to the veterinarian's lot, and he has put his fees at such figures that make it really profitable, it will be well to equip his place in such a manner that the work can be handled speedily, efficiently and economically. Beyond the statement that the electric clipper is a good investment for the man doing an appreciable amount of clipping, clippers will not be discussed here. Clipping should be done on a substantial table covered with galvanized iron that can be thoroughly cleaned without special effort. The table should be heavy enough to avoid sliding all over the floor when trying to control unruly dogs. The dog chain passes through openings in the table top and is then fastened on the edge of the table with clamps. This gives very efficient control of the animal. A small frame is attached to hold a can filled with kerosene and machine oil for periodic flushing of the clipper-head. Provision should be made for a clipper-head clamp within arm's reach.

In the same room, or in direct contact with it, are the bathing facilities. If a bath-tub is used, it should be raised from the floor so that the bottom will not be less than 20 inches from the floor. It is more economical, a great deal easier on the man, and avoids much struggling of the animal to wash it on a bench. The top is built on substantial legs and covered with heavy galvanized iron; height of bench, 2 feet; length, 4 feet; width, 2 feet. Immediately above and to one side we have hot and cold water, with a mixing-valve emptying into a hose from 6 to 10 feet long, with which the dog is wet and rinsed off. A small shelf with a guard holds liquid soaps in shaker bottles, as well as such disinfectant as may be used in antiseptic baths and brushes. A copper

tank overhead and also on the wall, with hot and cold water supply, is convenient for holding the antiseptic solution. From this angle it is spread over the dog with the attached hose. Immediately after the bath, the dog is turned loose in the bath enclosure to give him an opportunity to shake himself well, after which he is again tied upon the bench for towel-drying. (Make provision for a towel-rack.) From here the dog is placed in the drying chamber on a wire-mesh bench, through which heat rises, generated by steam coils below. (See figure 30.)

Cats are notoriously afraid of water, and a considerable part of their fright and fight can be overcome by covering part of a deep sink with a framed wire screen, and fastening the animal short to it with a neck-chain. By holding the hind legs in one hand, such traction is exerted as necessary to control the animal, while the other hand is free to dip water, handle the soap and do the scrubbing. Cats also should be dried in a small, screen-floored cage.

The Non-Productive Units

The vestibule: Any building of moderate size should have only one main entrance, which should be prominent enough to indicate it as such. I have seen a number of hospitals where patrons would try first one door and then the other and often walk off in disgust, thinking the place locked. If they had tried that little door down at the end, or around the corner, they would have found it open, and maybe there was a little sign stuck over it saying, "Office." The main entrance should not lead directly into the reception-room or out of the examination-room. Preferably, it should enter a hall or vestibule, from which a second door leads into the reception-room, and a third door opens into the vestibule from the examination-room, office or corridor, which collects traffic from the office, examination-room and the kennel wards. (See figure 31.) A blank wall space which will result from this arrangement will serve as an excellent support for a bulletin-board to announce in print the emphasis placed on rabies vaccination, prevention of distemper, clipping and bathing of dogs, or other items of similar nature of special or seasonal interest.

The reception-room: As a link between the owner's home and our place of business, there is no unit that serves this purpose better than the reception-room. This room gives us the opportunity to say, "Welcome." It also gives us the chance to impart

to the animal-owner that we think quite as much of his animal as he does. In this room we can pave the way to overcome his resistance, and prepare him to become willing to turn the patient over to our care. Nothing unpleasant should be permitted to happen in the interest between the client's entry into the reception-room and his departure. We must consider this room, not as a part of the hospital, but as the room of the owner of the patient, where we meet him on his own ground. The reception-room need not be ornate; to the contrary, a simple but tastily furnished arrangement is indicated. Built-in, cushioned seats along the wall probably serve the purpose best, for they will eliminate one of the chief annoyances of giving dogs the suggestion to raise their legs. Reading matter of recent date should be available. The size of the reception-room will depend upon the size of the hospital, of course, but a room 12 by 18 should be ample for a busy place. Instead of adding more space to the reception-room, to accommodate more waiting clients, it would be much better to install another examining-room and thus keep the patients moving. Doors should be kept at a minimum, preferably only two. A well-chosen picture or two and the doctor's diploma should be all in the line of wall decoration. (See figure 31.)

The Office

The office is the doctor's own place. In small hospitals, the doctor's desk, some files and a book-case are all that are contained therein. The office may be part of the reception-room or examining-room. In larger hospitals the office most likely would be divided off, to accommodate the secretary, stenographer and book-keeper, whose room should be in direct contact with public circulation. It should not be possible to reach the doctor's private office except through the secretary's office or in the examining-room. The following items should be considered in planning the office:

Desk and chair.
Filing equipment.
Typewriter-desk and typewriter.
Costumer.
Waste-basket.
Safe.
Cash register.
Book-case.

Bulletin board.
Dictaphone.
Client's chair.
Easy chair.
Magazine rack.

The Doctor's Dressing-Room

The dressing-room would connect with the doctor's office or the examining-room. Since it will be small, containing but a locker or two, with a bench and wash-basin, and since its importance is very subordinate, it can be placed most any place in the general plan, provided the location is not too unusual.

The Pharmacy or Drug Storage Room

If the pharmacy has not already been embodied in the examining-room, provision must be made here for the proper accommodation of the liquid medications, pills, biologics and sundries. Lockers with drawers, to hold empty bottles, cartons and other sundries, usually carry the shelving, and at the set-back furnish a work-table. Sectional pharmacy equipment, in which all drugs are concealed and protected from light and dust, are the last word for an up-to-date pharmacy. A refrigerator for biologics is an essential part of the veterinarian's pharmacy equipment. Large hospitals will always carry a certain amount of reserve stock for which a dark place, of no particular value for any other purpose, may be very easily found.

The Kitchen

Whether or not a hospital provides cooked food for its patients does not alter the kitchen requirements very greatly. If we have a kitchen unit, it should contain a gas heating plate in a small hospital, and a steam cooker in a larger institution. An automatic hot-water tank is an essential. A two-compartment dish-washing sink (stone laundry tray very suitable), shelving and lockers, all for the storage of food and reserve dishes, will be found necessary. Some provision must be made for the sterilization of the water-cups and feed-pans. This can be done with an autoclave or by dry heat over the gas-plate.

The Work-Room

If sufficient room is available, a work-room for individual attention to patients, like dressing wounds, applying casts, and so forth, will be found a great convenience. This room will

always absorb the largest portion of the daily brunt of disorder and untidiness, which would otherwise creep into the examining-room or surgery. A good work-table should be from 30 to 36 inches high, according to the veterinarian's own stature. Ample plumbing facilities should be available.

The Work-Shop

The work-shop will give us those mechanical facilities that every busy place needs. It should join a general storage-room. A fairly complete line of all kinds of mechanics' tools will always be found to be a profitable investment. However, it should not be this shop's intention to withhold from the regular trades such work that time will permit their doing.

The Morgue

The most positive unit of the non-productive portion is the morgue, with its incinerator. If its profound secrets are turned to good study, most disasters will eventually terminate in good revenue by virtue of the veterinarian's better grounding in the deep mysteries of questionable and mistaken diagnoses. The floor of this unit, of course, should be well drained and provision made to make a thorough and speedy clean-up possible. Some arrangement to permit the suspension of animals by their hind legs should be provided. A cupboard, with sterile specimen jars and vials, and drawers for the necessary instruments will be part of the autopsy-room. Unless an efficient garbage-disposal system will take care of the carcasses, it will become necessary to install an efficient incinerator or destructor for this purpose.

The Garage

The garage for the accommodation of the doctor's car, or an ambulance, or both, should by all means be included in the plan. The accessibility to street fronts and possible connections with the interior planning will determine its location in the general plan.

Units of Questionable Standing

The reason that the x-ray unit and pathological laboratory lean so strongly toward the non-productive side of our scale, is due to the fact that the public in general is not yet willing to pay for such services in addition to regular hospital fees. The time will come when they will develop into good revenue-producers, and then will completely alter our proportionate pic-

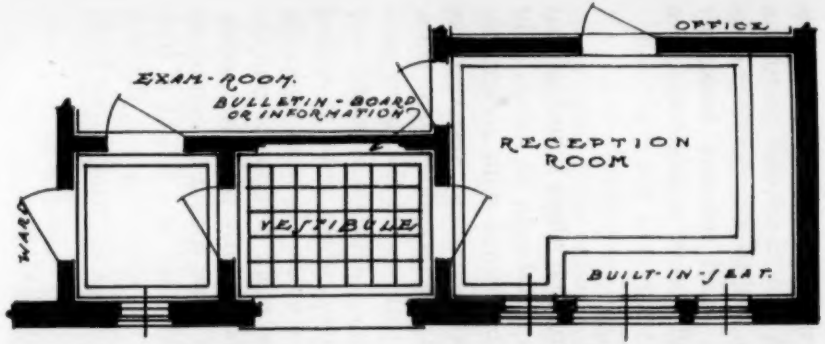

FIG. 31.

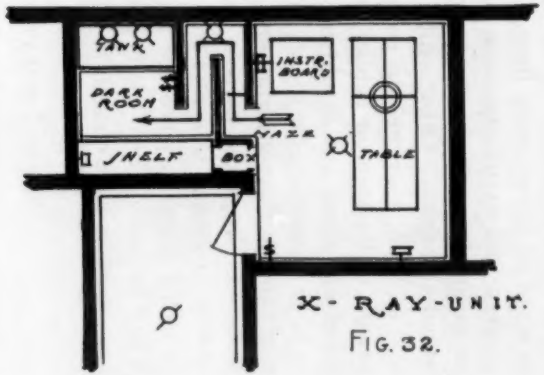

FIG. 32.

FIG. 33.

ture of productive to non-productive units. Fortunately, the x-ray unit does not consume valuable daylight space, and for that reason will help the plan to absorb undesirable inside area. Of course, most veterinary hospitals will carry only a small x-ray equipment, so that its installation will in reality not assume important proportions. The main-way of approach to the dark-room will be found most satisfactory, if the space is available. The pathological laboratory preferably should have outside exposure, and since benefits derived from it are still mostly for the veterinarian's profit, it might be well to incorporate this department with the pharmacy. A small compact laboratory table unit, with attached sink, should prove satisfactory. (See figure 32.)

The Floors

For economy of upkeep and construction, there is no floor that is equal to the concrete floor. It is suitable in all wards. The surgery and examining-room may be floored with terrazo tile or magnesite. Magnesite is somewhat resilient and therefore sound-absorbing. Other units, like the reception-room, office, and so forth, may well be covered with one of the many good brands of linoleum or rubber flooring. Linoleum is sound- and shock-absorbing but should not be used where water is applied in large quantities, for sooner or later water will work under the edges of the floor-covering and cause rapid deterioration of the material. Rugs and carpets are taboo in any place in a small-animal hospital. Concrete from the floors should be carried up in coved shape to place the floor-wall joint at a height of from 4 to 6 inches. Where tile is part of the wall structure, the cove base must be wide enough to allow for tile covering. (See figure 33.)

Sound Insulation and Walls

Noise in a veterinary hospital is very annoying and all efforts must be made to control this disturbing element to the utmost. The best method of sound control is at its source. Walls of wards should be built of, or at least covered from a certain height up with, a highly sound-absorbing material, such as very porous plaster, zenitherm, insulite, or other equally efficient materials now on the market for such purposes. Intervening glass partitions should be eliminated as much as possible. Walls built of hollow tile, gypsum blocks or wire lath and plaster will all transmit sounds, and since we are forced to have impervious floors

that are sound-reflecting, we must take recourse to all available measures to abate noise in all parts of the hospital where this spectre may enter, even from distant sources.

Windows

Fresh air and daylight are still to be had for the taking. All windows should be as large as the available wall spaces will permit. A large portion of this window should be movable, to control air currents from minimum to maximum. In certain types of buildings window cost and wall cost will be nearly equal.

Electric Power

Electric power is supplied in one of two currents, either direct (D. C.) or alternating (A. C.). All lights and heating units can be operated from either current: but motors, x-ray apparatus and other forms of electric equipment are designed for one or the other current. The power is usually brought into a central switch-board and from there distributed by feeders to different parts of the building. X-ray equipment should be carried by a special feeder. Ample light outlets should be provided but they should have no connection with convenience outlet circuits. Drop-cords are suitable in small rooms or closets, but the larger rooms should be illuminated with standard light fixtures of the glass-bowl-enclosed type. Convenience outlets are placed where they are most needed and at a height that best corresponds with their use.

The examining-room and surgery require special light-fixtures. Two or three good spot-lights high up near the ceiling and one at the animal's face height, all switch-controlled, are best for the examining-room. In the surgery, if possible, one should install one of the many good shadow-free lights of the suspension type. The principle of these lights lies in the fact that each cast shadow is undermined and superilluminated by the neighboring light. The surgery and examining-room lights should be carried on individual circuits and supplemented with auxiliary safety lights derived from the general circuit.

Plumbing

Hospital operation requires comparatively large quantities of water. Cleanliness is the basis of efficient sanitary service. In order to economize in labor, nursing cost and doctors' time, it is essential that the plumbing be well distributed to several stra-

tegic points and waste collected therefrom. Plumbing has advanced much of late years and today's plumbing fixtures are very good to look at. Much thought has been given by the manufacturers to the utility of their products for special purposes, and from the large assortment on the market we are sure to be able to pick just what we want. In the examining-room, the surgery and the wards, hot and cold water faucets are best of the wrist-control type. Special fixtures of a deep and square type are required for the examining-room and surgery, while other plumbing outlets are very well served with basins of the standard types. A janitor's slop-sink will take a heavy and disagreeable load from the other fixtures.

In new installations, all floors should have a fall of one inch to every ten feet towards judiciously placed floor-drains, so as to insure immediate disappearance of all floor water accidentally spilled or intentionally applied with mop or hose.

Heating and Ventilation

Heating is a considerable item in a small-animal hospital. Heat may be secured by several different methods. Much will depend on the geographic location of the hospital. In the warmer climes, properly located individual gas units are quite satisfactory In some localities a hot-air furnace might supply all the heat needed, while for really efficient temperature regulation we depend on hot water or low or high pressure steam to carry the heat to the building periphery by means of pipe coils or radiators. Where commercial steam is available, the problem is very readily solved to perfection. These matters, however, are of such a technical nature that only experts in this line should be consulted.

Forced ventilation should be installed where any of the rooms are devoid of all outside exposure. A good supply of cooled or warmed air driven into the building by blower fans through ducts and exhausted through vents in strategic locations is the system most effectively employed.

Black Locust Shoots Kill Lambs

The loss of a flock of forty lambs near Cassopolis, Mich., in September, was attributed to the eating of the tender shoots springing from black locust trees in the pasture where the lambs were feeding.

STUDIES OF NORMAL BLOOD PRESSURE IN ANIMALS

I. Blood Pressure in the Horse With Brief Note on the Ox*

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The practical determination of blood pressure by the indirect (compression) method in the various species of higher mammals (excluding man) is but imperfectly known. Horning and Kirkwood, in 1924, made limited blood pressure determinations in dogs.

In view of the fact that much valuable clinical information may be had from the correct interpretation of the functional reactions of the circulatory mechanism, an attempt has been made to bring before the veterinary profession preliminary findings relative to the study of the normal blood pressure in horses and cattle, based upon methods in use in human medicine.

It is true that the recording of blood pressure in the higher mammals under domestication is not an easy procedure. This is largely because of the difficulties encountered in finding a suitable peripheral artery situated in a convenient place to permit the use of compression and inflation methods with the aid of a rubber cuff attached to a recording sphygmomanometer. Again the question of muscle relaxation should be considered, since it is of vital importance in the accurate determination of blood-pressure readings. This is readily accomplished in man, where the upper arm forms a most convenient place for the proper adjustment of the rubber sleeve above the elbow and directly over the brachial artery.

HISTORICAL

Doubtless, the remarkable discoveries of William Harvey, who in the sixteenth century definitely proved the existence of circulation and the relations of the central pump, the heart, to the moving blood in the blood-vessels and, later, Malpighi, the discoverer of the capillary circulation (1661), paved the way to many advances by those investigators whose progress was based upon the knowledge of circulation.

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In 1773, Stephen Hales was first to make exact measurements of the pressure of blood in the large arterial vessels. He used a direct method of blood pressure determination by connecting the femoral artery in the horse with a glass tube. There was a rise of the blood in the tube to the height of about 8 feet and 3 inches. At this point the blood column in the tube showed oscillation with each cardiac systole. Later (1828) Poiseuille made noted changes in Hale's method by using a U-shaped tube containing mercury, one limb of which was connected with the artery through tubing under pressure. The height to which the displaced mercury was lifted was measured in millimeters. Thus the meaning of the term used to express the pressure of blood in millimeters of mercury is that a given column of mercury is lifted to the height of so many millimeters. This apparatus was named the mercury manometer.

In 1847, Ludwig made a valuable discovery leading to the use of graphic determinations. A float was provided by him with a writing-pen attached. This was added to the Poiseuille's U-tube and a tracing made of the circulatory changes. In this manner he obtained absolute values of the arterial blood pressure.

Direct determinations of arterial blood pressure involving the opening of an artery are only of scientific interest and of no practical value, consequently it was necessary to design apparatus by which the measurements of blood pressure could be carried out without surgical intervention and by an indirect method.

Basch (1876) was first to devise an instrument by which direct readings of blood pressure in man were possible. Others have made interesting modifications. Thus Marey (1876) and later (1895) Mosso (modified by Hurthle) made valuable contributions. Finally, a practical method was worked out by Riva Rocci (1896) who made a simple instrument with a counter pressure applied to the brachial artery through an inflated rubber cuff, reënforced by a cover made of cloth and connected with a mercury manometer.

Since the introduction of the Riva-Rocci sphygmomanometer, many improved instruments have been devised, some of which are mercury manometers. Here the pressure is read directly in terms of millimeters of mercury. There is a convenient apparatus available, which makes possible the reading of blood pressure from a calibrated aneroid gauge, a substitute for the original mercury manometer.

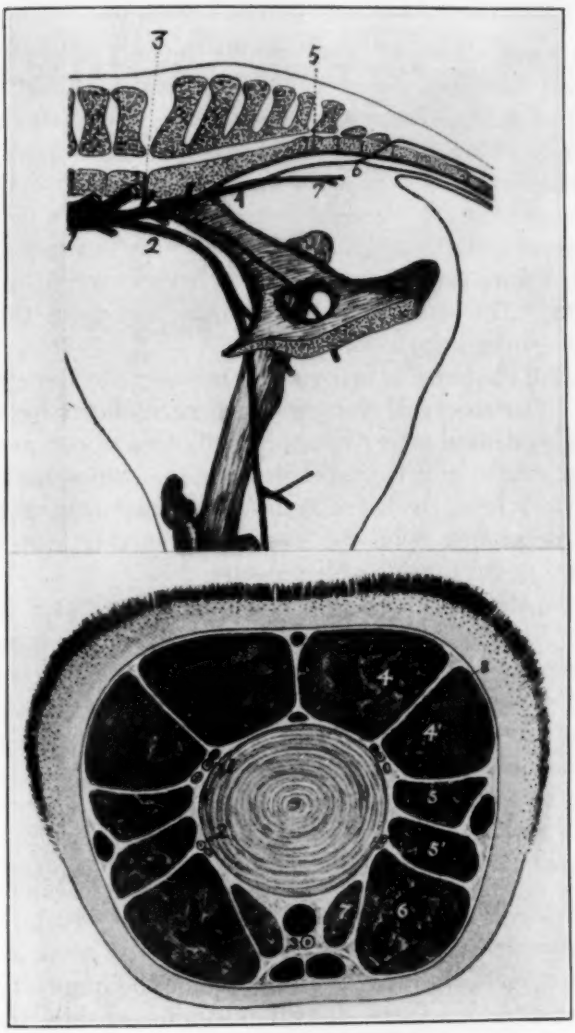

FIG. 1 (above). Illustration to demonstrate the terminal branches of the aorta in the horse, and the course which they take from the aorta to the middle coccygeal artery. 1, aorta; 2, external iliac artery; 3, internal iliac artery; 4, lateral sacral artery; 5, middle coccygeal artery; 6, lateral coccygeal artery, dividing into dorsal and ventral radicles; 7, posterior gluteal artery.

FIG. 2 (below). Cross-section of the tail of a horse showing the position of the coccygeal vessels. 1, dorso-lateral coccygeal artery; 2, ventro-lateral coccygeal artery; 3, middle coccygeal artery; 4, sacro-coccygeus dorsalis; 4^1, sacro-coccygeus lateralis; 5 and 5^1, intertransversalis; 6, sacro-coccygeus ventralis; 7, recto-coccygeus; 8, coccygeal fascia; 9, fibrocartilage between fourth and fifth coccygeal vertebrae. The veins are black (after Sisson).

Blood-Vessels Involved Relative to Determinations of the Arterial Blood Pressure

In the horse, the middle coccygeal is the only artery available for correct determinations of blood pressure. This vessel is quite superficial and conveniently situated. It is a single vessel, arising from either the right or left lateral sacral artery. The latter vessels are the branches of the internal iliac arteries, which in turn come from the terminal branches of the aorta (see fig. 1).

The position of the middle coccygeal artery is ventral and on the medial line, extending backward, being covered with skin and fascia. The pulse may be taken readily from this vessel almost the entire length of the tail.

The tail of the horse in many respects resembles the upper arm of man. The coccygeal vertebrae are surrounded by muscles, leaving a good-sized artery comparatively free to compress when a suitable rubber cuff is properly adjusted. Since the distance of this artery from the aorta is not very great (about 165 cm., variable, depending upon the size of the animal), the blood is maintained under considerable pressure.

In cattle, the saphenous artery was attempted as a means of approach. The saphenous artery is a relatively large vessel. It arises from the femoral artery and gains a medial superficial position on the limb by passing medially between the lower portion of the bodies of the gracilis and the sartorius muscles. The saphenous artery is accompanied by a vein and nerve of the same name. It lies in the fascia on the medial side of the limb, just posterior to the shaft of the tibia. The pulse of cattle may be taken here more readily than at any other place.

The Procedure and Apparatus Used

After examination of the various apparatus used in human medicine, it was found that the Lifetime baumanometer and the calibrated aneroid Tycos sphygmomanometer are the most practical clinical instruments (see fig. 3).

The next step was to design a suitable cuff which may be easily applied by even the inexperienced operator. Careful measurements were made as to the width and length of the compressor cuff when snugly fitted around the root of the tail of an average-sized horse. A rubber cuff with the following measurements was found to be most satisfactory: 7 cm. wide, 35½ cm. long; enclosed in a cloth cover, 116 cm. long, gradually tapering from the widest point (7 cm.) to 2 cm. (see figs. 4 and 5). At a

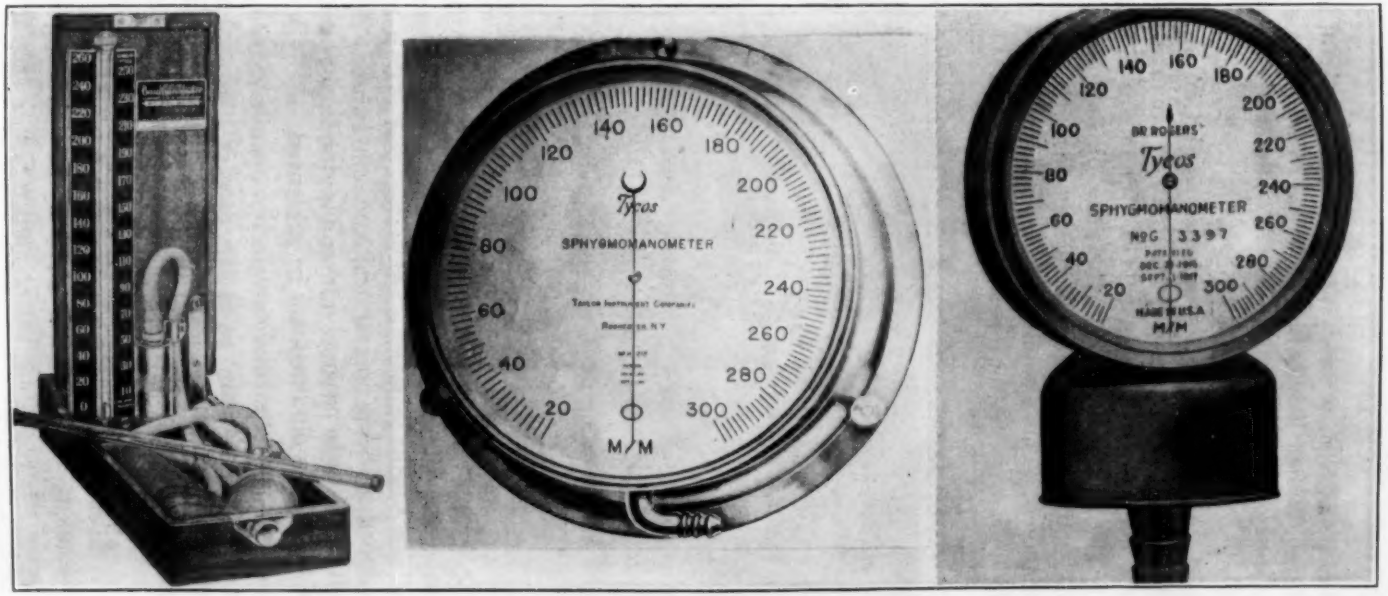

FIG. 3 (left). Lifetime baumanometer (Courtesy of A. S. Aloe Co., St. Louis, Mo.); (center) Tycos sphygmomanometer (large office type); (right) Tycos sphygmomanometer (small type).

distance of 7 cm. from the widest end of the rubber cuff are two rubber tubes, 20 cm. long, which serve as points of connection with the sphygmomanometer or baumanometer and the inflating bulb.

A similar cuff, but of greater dimensions and an appropriate shape, was designed to encircle the limb of an average-sized cow, fitted over the saphenous artery. While this cuff may be applied to the limb with comparative ease, unfortunately it was found that sufficient relaxation of the muscles of the limb could not be obtained. This seriously interferes with correct reading of the blood pressure. After repeated manipulations this method

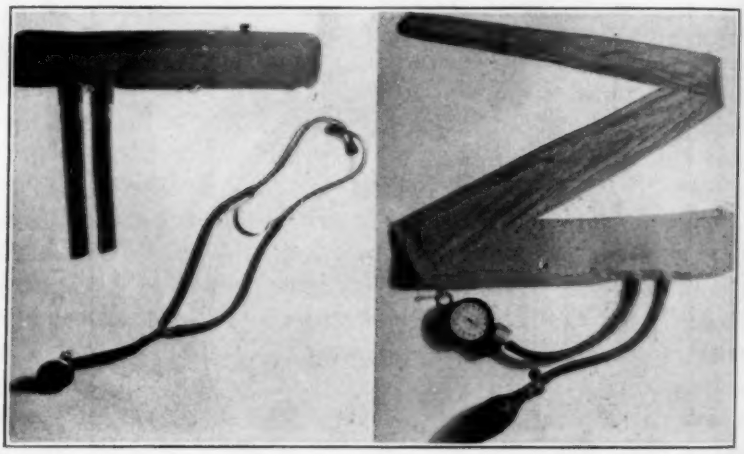

FIG. 4 (left). A special rubber compressor or cuff designed to encircle the tail of an average-sized horse.

FIG. 5 (right). Sphygmomanometer and inflating bulb attached to the horse compressor-cuff.

was abandoned as being impractical and inaccurate. Further experimentations are in progress now and in due time preliminary reports of the results obtained will be presented.

In the horse, the apparatus was found to operate satisfactorily and with as much accuracy as in the case of man, where the instrument encircles the upper arm. The results obtained were gratifying, the application is simple and the manipulation not difficult.

In order to check the results of the blood-pressure readings, both the small and large (office type) Tycos recording sphygmomanometer, the Lifetime baumanometer and the ordinary mercury manometers (Riva-Rocci) were used. To correct the

results further in the case of each animal three readings were made. The average pressure of the three readings in the animals examined represents the normal pressure.

Technic

It is imperative that the operator, preliminary to the adjustment of the blood-pressure instrument, first gain an absolute confidence of the animal under examination. It is a well known fact that animals are readily disturbed and especially by strangers. Therefore, rough handling and abuse of the animal will terminate in complete failure, owing to the rapid rise of the blood pressure to several millimeters of mercury above normal.

Ordinarily, animals that are being handled considerably are not readily excited in the presence of a strange person, but there are many horses that positively object to handling by other than the usual person. This was overcome in most cases by the presence of the owner or caretaker. Keeping this in mind, one should use his best judgment in order to gain the confidence of the animal and bring about a proper relaxation of the voluntary muscles.

In order to prevent soiling of the cuff, it may be necessary to clean the under surface of the tail. Usually this is found unnecessary when the animals are well taken care of and regularly groomed.

With the animal in standing position and relaxed, the cloth-covered compressor is applied in the following manner: That portion of the cuff containing the rubber bag is placed over the dorsal surface of the root of the tail and as high as possible, starting from the left to the right (the operator is back of the animal). The free ends of the connecting tubes point upward and toward the dorsal part of the body, somewhat to the left of the median plane as the operator stands immediately behind the animal. The remaining portion of the cuff is now wrapped around the tail somewhat like a bandage, the terminal part being tucked under the preceding fold. One should be careful not to bind the tail too tightly, so as to shut off the flow of the blood in the blood-vessels. Next the projecting tubes of the bag-like sleeve are connected. To the left tube the manometer is attached, and to the right the inflating bulb is connected. If the operator is left handed, it may be necessary to reverse the order of connection. The manometer tube may be held in the left hand of an assistant. If such a person is not available, reverse the sleeve

with the connecting tubes pointing downward and towards the tail (see fig. 6).

After the third or fourth wrapping, the manometer tube is reversed and secured to the cuff by continuous wrapping of the free end of the sleeve cloth. In this position the end of the manometer tube projects about 2 cm. and will readily support the manometer (see fig. 6). In case a baumanometer (a very convenient and accurate instrument) is used, a longer connection is necessary for the baumanometer to the sleeve.

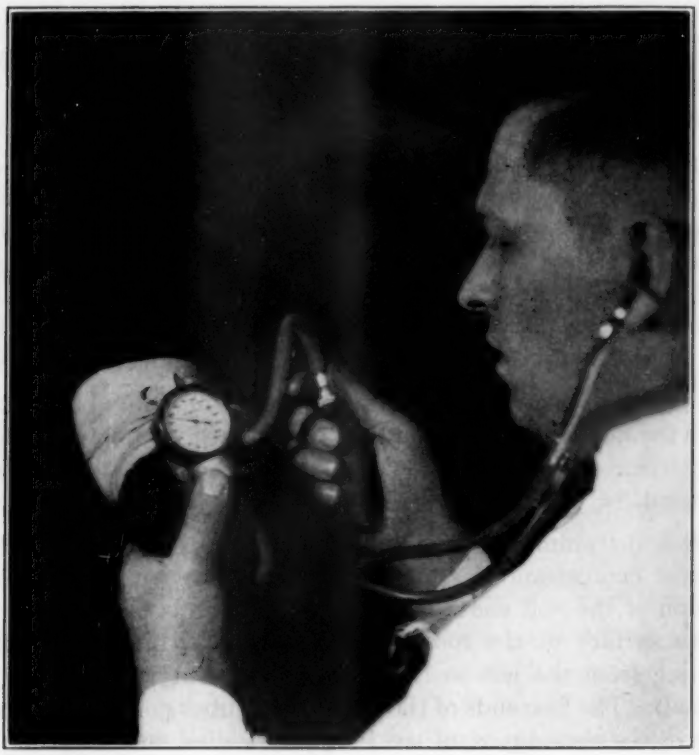

FIG. 6. The cuff reversed, manometer in position, blood-pressure readings made by the operator alone. (In this case the auscultation method was used.)

During the adjustment of the sleeve some animals hold the tail down and the muscles are rigid. The blood-pressure reading should not be made until complete relaxation is obtained. This is readily accomplished if the tail is let down. While waiting for the muscles to relax it is well to find the pulse from the middle coccygeal artery.

There are two methods which may be used to determine blood pressure: One is the palpation method, the other is the auscultatory method. Of the two the auscultatory method is the more accurate, but impractical in horses, since it is difficult to restrain the movements of the animal, rendering the sounds created by the blood within the artery inaudible, resulting in serious error of the readings.

In the auscultatory method a suitable stethoscope is placed immediately below the cuff and over the medial coccygeal artery. The rubber bag is then slowly inflated. At first no sound is detected, but as the inflation proceeds a distinct sound is heard gradually decreasing in loudness and sharpness with each compression of the inflating bulb until a pressure is reached when it becomes very faint and finally disappears. This point is noted on the calibrated manometer and the pressure in the sleeve is increased for several millimeters of mercury (about 10 to 20). The pressure is now slowly reduced by a slight opening of the release valve attached to the inflating bulb until a clear, sharp sound can be detected. The lowest level of the hand of the oscillating dial (or mercury when mercury manometer is used) will indicate the systolic pressure (the first phase indicating the index of systolic blood pressure). The pressure is then further reduced a few millimeters at a time, noting the changes in the sharp clear sound of the systolic pressure into a less pronounced sound (second phase) followed by a clear sound (third phase), which is transformed into a dull sound almost at the point of disappearance. The reading of the lowest level of the oscillating dial at this time indicates diastolic pressure. Following this the sound disappears altogether (fifth phase). Since the detection and interpretation of these sounds is difficult and inaccurate unless the animal is extremely quiet, this method is recommended only in exceptional cases (see fig. 6).

In the palpation method of estimating the systolic pressure the reading depends upon accurate pulse-taking. The procedure is as follows: With the palpating fingers in position the pulse is located. The sleeve is then gradually inflated until the pressure completely obliterates the artery and the pulse disappears. This point should be noted on the manometer and the pressure in the cuff increased some 20 millimeters of mercury. By releasing the valve on the inflating bulb, the pressure is slowly decreased until the pulse again reappears. This point should be noted

immediately. The lowest reading of the hand of the dial indicates the systolic pressure.

The diastolic pressure may be detected by the use of the oscillatory method and in the following manner: The systolic pressure having been determined by the palpation method, the pressure in the cuff is lowered a few millimeters, while in the meantime the oscillation of the hand of the dial is noted. When there is an abrupt decrease following the greatest oscillation, the lowest level of the hand of the dial represents the diastolic pressure.

The large, office type of Tycos sphygmomanometer gives reliable results, but the small size is not so accurate. In case the baumanometer is used, for diastolic pressure determination, the auscultation method is indicated.

Since horses cannot be restrained as human beings, the various sounds that are produced in the auscultatory method are at times difficult to hear clearly. Ready errors may occur, especially in the hands of an inexperienced operator. Knowing the fact that movements upon the part of the animal disturb clear audibility of the sounds, with inevitable errors resulting from this, the palpation method was adopted in systolic readings and either the oscillatory or the auscultation method in the diastolic readings. Comparative study was made, however, to ascertain the variations in the readings of the two methods. The following average variations were found: In the determinations of the systolic pressure, 3 to 6 millimeters of mercury higher by auscultatory method; while in the study of the diastolic pressure, 2 to 5 millimeters higher by auscultatory method. This is shown in table I.

TABLE I—*Comparative study of two methods*

SEX	AGE	WGT. (LBS.)	PULSE	RESP.	AUSCULTATION METHOD		PALPATION METHOD	
					SYSTOLE	DIASTOLE	SYSTOLE	DIASTOLE
Gelding	20	1000	40	18	130	100	126	95
Gelding	9	1200	32	16	104	65	102	60
Gelding	13	1100	38	18	98	70	92	66
Mare	12	1200	36	20	95	65	90	58
Mare	16	1000	34	14	92	60	90	56

From this it may be seen, that the variation in the two methods is not so great as to cause a disturbance in the estimation of normal standards of blood pressure. On many other occasions when the

animal was found to be quiet, the auscultation method was checked against the palpation and oscillation methods.

In the extreme cases, where the diastolic pressure has a great value in the clinical study of certain affections the auscultation method may be supplemented. But from a practical standpoint and from the standpoint of the practitioner the palpation is the only method recommended which is carried out readily and with minimum error.

Caution: During the manipulation of the rubber cuff it should be borne in mind that too sudden inflation may cause local arterial spasm, which is probably due to changes in the arterial tonus.

In some animals the arteries are quite sensitive to irritation and as a result may contract locally under the pressure of the inflated cuff, especially when the inflation is too sudden. Local arterial spasm may be prevented when the inflation is made gradually. The readings should be repeated until it is constant. Keeping this in mind, in each case examined, at least three readings were made and from these the average blood pressure was determined. In cases where the pressure was found to be unusually high during the first reading, the manipulation was repeated periodically and carefully checked for possible errors. In addition other examinations were made of the physical condition of the animal in order to find the probable cause of the hypertension.

The Results Obtained

The number of animals examined was 224. In all cases healthy horses were selected under the best of conditions and care. Of the 224 animals there were 46 mares and 178 geldings. Only two stallions are shown on this record and a few young colts. It is realized that this is an insufficient number of animals upon which to base definite conclusions concerning the normal blood pressure in horses. Therefore, additional experimentation is necessary in order to obtain more reliable average results. This is especially true if sex and age variations are to be included. At least three types of animals are tested; the cavalry horse, the artillery horse and the heavy draft horse.

Through the courtesy of the Potlatch Lumber Company and the coöperation of Dr. Kenneth A. White, extremely fine specimens of draft types were made available. Some of the artillery and cavalry horses are owned by the U. S. Army, while others are

the property of the Idaho National Guard, located at Coeur d' Alene, Moscow and Lewiston, Idaho.

Every precaution was taken to secure healthy animals under regular conditions of feed and care. The horses examined from the Potlatch Lumber Company were idle horses kept in stables at Bovill, Idaho, under ideal conditions of food and care and under the constant supervision of a veterinarian. The army horses, of course, were kept under regular conditions as prescribed by the army regulations. Readings were taken from a few pure-bred Percherons from the farm of the University of Idaho, at Moscow. Horses kept under irregular conditions with regard to food, shelter, care and work, as most farm animals are handled, were not considered.

The number of mares is considerably smaller than the number of geldings. Consequently, to determine sex variation more work is necessary. However, it is planned to continue this investigation not only in the normal animals, but in all available clinical cases, in order to arrive at some final conclusions as to the circulatory disturbances during diseased conditions.

Tables II and III give a complete record of the animals examined.

From the data in table II it is to be seen that there seems to be sex and age differentiation of blood pressures. According to the results obtained, the pressure in mares seems to run lower than that of geldings. Accordingly a curve was made for both the geldings and the mares. From this, an average pressure was calculated which may be seen in charts 1 and 2.

The usual systolic pressure in mares was found to fluctuate between 86 to 98 millimeters of mercury, and that of geldings from 90 to 104 millimeters of mercury. According to the curve the general average for the mare was 90 millimeters of mercury for systolic pressure and for the gelding 98 millimeters of mercury.

In colts the systolic pressure was found to be lower than in the adult horse (but here again the number of animals examined is insufficient), the average being 80 mm. systolic pressure and for diastolic pressure about 50 millimeters of mercury. Extreme care should be exercised in taking the blood pressure of a colt, since on the slightest disturbance the pressure goes up 30 to 50 millimeters of mercury above that which is apparently normal.

The diastolic pressure was found in the adult horse to be variable, with a difference of from 20 to 45 millimeters of mercury

TABLE II—*Data on male animals*

No.	Sex	Type	Age	Weight (lbs.)	Pulse	Resp.	Systolic Pressure	Diastolic Pressure	Remarks
1	Stud Colt	Draft	5 mos.	500	44	22	112	73	Nervous
2	Stud Colt	Draft	5 mos.	475	66	16	82	50	
3	Stud Colt	Draft	5 mos.	400	60	18	80	55	
4	Stud Colt	Draft	5 mos.	500	48	16	74	50	
5	Stud Colt	Draft	6 mos.	500	54	18	74	45	
6	Gelding	Draft	2½ yrs.	1000	50	30	116	70	Nervous
7	Stud Arab	Saddle	3 yrs.	800	50	36	117	80	Nervous
8	Gelding	Draft	3 yrs.	1750	42	18	106	68	
9	Gelding	Draft	4 yrs.	2100	44	18	82	64	Phlegmatic
10	Gelding	Draft	4 yrs.	1760	38	10	110	74	
11	Gelding	Draft	4 yrs.	1750	40	20	96	58	
12	Gelding	Draft	4 yrs.	1775	44	20	90	50	
13	Gelding	Cavalry	4½ yrs.	1050	36	15	117	67	
14	Gelding	Cavalry	5 yrs.	1000	36	16	96	65	
15	Gelding	Cavalry	5 yrs.	1050	38	12	102	74	
16	Gelding	Cavalry	5 yrs.	1000	44	18	100	70	
17	Gelding	Cavalry	5 yrs.	1050	37	13	104	70	Jumper
18	Gelding	Draft	5 yrs.	2000	45	17	108	70	
19	Gelding	Draft	5 yrs.	2020	44	12	100	60	
20	Gelding	Shetland	5 yrs.	460	36	23	86	60	
21	Gelding	Draft	5 yrs.	1830	43	14	114	62	Injured
22	Gelding	Draft	5 yrs.	2010	40	20	98	60	
23	Gelding	Draft	5 yrs.	1800	44	12	112	75	
24	Gelding	Draft	5 yrs.	2010	44	17	98	70	
25	Gelding	Draft	5 yrs.	1880	46	14	104	62	
26	Gelding	Artillery	6 yrs.	1150	50	19	98	59	
27	Gelding	Cavalry	6 yrs.	1000	34	14	116	62	
28	Gelding	Artillery	6 yrs.	1100	43	12	94	60	
29	Gelding	Draft	6 yrs.	2040	41	16	92	62	
30	Gelding	Draft	6 yrs.	1750	56	18	99	70	
31	Gelding	Draft	6 yrs.	1850	43	13	96	58	
32	Gelding	Draft	6 yrs.	1700	40	10	96	60	
33	Gelding	Draft	6 yrs.	1980	40	16	96	65	
34	Gelding	Draft	6 yrs.	1940	38	17	98	60	
35	Gelding	Draft	6 yrs.	1940	42	18	109	72	
36	Gelding	Draft	6 yrs.	1960	42	19	102	70	
37	Gelding	Draft	6 yrs.	1850	38	16	102	73	
38	Gelding	Draft	6 yrs.	1870	38	12	102	70	
39	Gelding	Draft	6 yrs.	1850	46	16	90	55	
40	Gelding	Draft	6 yrs.	1870	44	16	92	60	
41	Gelding	Draft	6 yrs.	1790	42	17	100	65	
42	Gelding	Draft	6 yrs.	1790	38	18	100	58	
43	Gelding	Draft	6 yrs.	2000	42	16	98	62	
44	Gelding	Draft	6 yrs.	1760	42	20	100	60	
45	Gelding	Cavalry	7 yrs.	1050	36	18	92	60	
46	Gelding	Cavalry	7 yrs.	1030	35	16	89	64	
47	Gelding	Cavalry	7 yrs.	1000	40	16	98	64	
48	Gelding	Cavalry	7 yrs.	1100	32	12	92	55	
49	Gelding	Cavalry	7 yrs.	985	33	11	92	64	
50	Gelding	Cavalry	7 yrs.	1040	33	10	88	62	
51	Gelding	Cavalry	7 yrs.	960	31	15	98	67	
52	Gelding	Cavalry	7 yrs.	1150	32	11	89	60	
53	Gelding	Artillery	7 yrs.	1200	45	12	104	60	
54	Gelding	Saddle	7 yrs.	900	42	15	104	64	

TABLE II—*Data on male animals—Continued*

No.	Sex	Type	Age	Weight (lbs.)	Pulse	Resp.	Systolic Pressure	Diastolic Pressure	Remarks
55	Gelding	Artillery	7 yrs.	1150	37	11	100	68	
56	Gelding	Draft	7 yrs.	2200	47	14	104	70	
57	Gelding	Draft	7 yrs.	2180	42	20	100	58	
58	Gelding	Draft	7 yrs.	2140	42	23	98	60	
59	Gelding	Draft	7 yrs.	1980	40	20	108	70	
60	Gelding	Draft	7 yrs.	1860	38	16	102	65	
61	Gelding	Draft	7 yrs.	1900	42	20	90	57	
62	Gelding	Draft	7 yrs.	1850	40	17	102	75	
63	Gelding	Draft	7 yrs.	1650	40	24	97	70	
64	Gelding	Draft	7 yrs.	1980	48	30	96	70	
65	Gelding	Draft	7 yrs.	1850	39	19	98	64	
66	Gelding	Draft	7 yrs.	1890	44	18	98	58	
67	Gelding	Draft	7 yrs.	2040	44	18	112	74	
68	Gelding	Draft	7 yrs.	1880	40	12	104	60	
69	Gelding	Draft	7 yrs.	1890	44	16	102	64	
70	Gelding	Draft	7 yrs.	1750	40	13	96	62	
71	Gelding	Draft	7 yrs.	1950	42	18	100	64	
72	Gelding	Draft	7 yrs.	1820	42	18	88	50	
73	Gelding	Draft	7 yrs.	1840	43	16	96	60	
74	Gelding	Cavalry	8 yrs.	1100	40	13	98	65	
75	Gelding	Artillery	8 yrs.	1200	42	13	105	66	
76	Gelding	Artillery	8 yrs.	1150	42	10	100	60	
77	Gelding	Draft	8 yrs.	1750	43	18	98	50	
78	Gelding	Draft	8 yrs.	1880	46	16	98	65	
79	Gelding	Draft	8 yrs.	1910	42	14	94	60	
80	Gelding	Draft	8 yrs.	1150	32	14	97	65	
81	Gelding	Saddle	8 yrs.	1000	36	18	102	70	
82	Gelding	Saddle	8 yrs.	900	30	16	98	64	
83	Gelding	Draft	8 yrs.	1250	34	12	98	60	
84	Gelding	Saddle	8 yrs.	950	30	12	88	50	
85	Gelding	Saddle	8 yrs.	1000	40	15	92	55	
86	Gelding	Draft	8 yrs.	1350	33	16	97	60	
87	Gelding	Draft	8 yrs.	1900	46	10	109	70	
88	Gelding	Draft	8 yrs.	1900	48	17	96	60	
89	Gelding	Draft	8 yrs.	2000	44	18	96	65	
90	Gelding	Draft	8 yrs.	1860	40	16	109	75	
91	Gelding	Draft	8 yrs.	1880	46	17	98	62	
92	Gelding	Draft	8 yrs.	1750	43	18	96	62	
93	Gelding	Draft	8 yrs.	1780	40	18	98	70	
94	Gelding	Draft	8 yrs.	1960	43	13	98	62	
95	Gelding	Draft	8 yrs.	1980	42	19	98	65	
96	Gelding	Draft	8 yrs.	1920	40	16	92	48	
97	Gelding	Draft	8 yrs.	2060	40	19	96	60	
98	Gelding	Draft	8 yrs.	1780	42	17	104	68	
99	Gelding	Draft	9 yrs.	1750	40	12	90	60	
100	Gelding	Artillery	9 yrs.	1150	37	12	95	60	
101	Gelding	Draft	9 yrs.	2050	45	14	104	60	
102	Gelding	Draft	9 yrs.	1900	48	19	104	64	
103	Gelding	Draft	9 yrs.	1900	42	20	102	60	
104	Gelding	Draft	9 yrs.	1900	40	18	109	64	
105	Gelding	Draft	9 yrs.	1860	42	18	110	74	
106	Gelding	Shetland	9 yrs.	510	48	22	92	70	
107	Gelding	Draft	9 yrs.	1680	39	14	94	60	
108	Gelding	Draft	9 yrs.	1840	40	18	102	65	

TABLE II—*Data on male animals—Continued*

No.	Sex	Type	Age	Weight (lbs.)	Pulse	Resp.	Systolic Pressure	Diastolic Pressure	Remarks
109	Gelding	Draft	9 yrs.	1880	38	12	105	70	
110	Gelding	Draft	9 yrs.	1880	40	14	98	62	
111	Gelding	Draft	9 yrs.	1840	42	10	88	50	
112	Gelding	Draft	9 yrs.	1950	42	16	102	74	
113	Gelding	Draft	9 yrs.	1780	36	11	122	80	
114	Gelding	Artillery	9 yrs.	1200	32	16	102	60	
115	Gelding	Cavalry	10 yrs.	1100	34	17	115	82	
116	Gelding	Cavalry	10 yrs.	1100	40	14	88	57	
117	Gelding	Saddle	10 yrs.	900	44	12	88	50	
118	Gelding	Draft	10 yrs.	1250	36	15	100	68	
119	Gelding	Artillery	10 yrs.	1150	43	13	97	68	
120	Stud	Draft	10 yrs.	1800	34	12	92	58	
121	Gelding	Draft	10 yrs.	2050	40	16	106	60	
122	Gelding	Draft	10 yrs.	2060	42	16	94	52	
123	Gelding	Draft	10 yrs.	1920	40	14	84	50	
124	Gelding	Draft	10 yrs.	1810	44	18	92	58	
125	Gelding	Draft	10 yrs.	1850	40	16	96	60	
126	Gelding	Draft	10 yrs.	1790	40	16	95	60	
127	Gelding	Draft	10 yrs.	2060	40	18	94	69	
128	Gelding	Draft	10 yrs.	2080	42	16	98	64	
129	Gelding	Cavalry	11 yrs.	950	36	16	100	65	
130	Gelding	Cavalry	11 yrs.	1100	28	10	90	60	
131	Gelding	Cavalry	11 yrs.	1135	34	12	92	60	
132	Gelding	Draft	11 yrs.	1900	38	12	105	74	
133	Gelding	Draft	11 yrs.	1910	44	16	102	65	
134	Gelding	Draft	11 yrs.	1790	38	13	98	60	
135	Gelding	Cavalry	12 yrs.	1075	37	11	90	60	Ridden hard
136	Gelding	Cavalry	12 yrs.	1100	29	13	98	70	
137	Gelding	Saddle	12 yrs.	950	38	20	100	65	
138	Gelding	Artillery	12 yrs.	1200	43	12	100	60	
139	Gelding	Artillery	12 yrs.	1150	36	11	100	60	
140	Gelding	Artillery	12 yrs.	1200	38	11	109	68	
141	Gelding	Draft	12 yrs.	1700	40	12	100	60	
142	Gelding	Draft	12 yrs.	1930	52	20	110	74	Nervous
143	Gelding	Draft	12 yrs.	1910	40	18	94	65	
144	Gelding	Cavalry	13 yrs.	1000	34	18	102	65	
145	Gelding	Draft	13 yrs.	2040	40	10	92	60	
146	Gelding	Draft	13 yrs.	1700	44	16	90	50	
147	Gelding	Draft	13 yrs.	1910	40	14	94	65	
148	Gelding	Draft	13 yrs.	1780	42	14	104	70	
149	Gelding	Cavalry	13 yrs.	1100	45	18	90	68	
150	Gelding	Artillery	14 yrs.	1200	39	13	102	80	
151	Gelding	Artillery	14 yrs.	1180	46	16	99	65	
152	Gelding	Artillery	14 yrs.	1200	38	12	104	60	
153	Gelding	Draft	14 yrs.	2140	49	13	88	48	
154	Gelding	Draft	14 yrs.	1900	42	18	94	60	
155	Gelding	Draft	14 yrs.	1890	40	18	94	50	
156	Gelding	Draft	14 yrs.	1900	40	14	92	55	
157	Gelding	Draft	14 yrs.	1780	40	14	102	60	
158	Gelding	Cavalry	15 yrs.	1100	39	16	90	60	
159	Gelding	Cavalry	15 yrs.	1120	48	20	120	86	Nervous
160	Gelding	Cavalry	15 yrs.	1150	30	15	98	72	
161	Gelding	Artillery	15 yrs.	1300	40	13	98	55	
162	Gelding	Draft	15 yrs.	1900	39	12	95	62	

TABLE II—*Data on male animals—Concluded*

No.	Sex	Type	Age	Weight (lbs.)	Pulse	Resp.	Systolic Pressure	Diastolic Pressure	Remarks
163	Gelding	Artillery	16 yrs.	1200	38	13	114	74	
164	Gelding	Saddle	16 yrs.	1000	39	11	104	62	
165	Gelding	Draft	16 yrs.	1780	38	17	92	60	
166	Gelding	Cavalry	17 yrs.	1080	32	12	89	50	
167	Gelding	Cavalry	17 yrs.	1100	38	14	124	85	
168	Gelding	Draft	17 yrs.	1900	42	20	102	61	
169	Gelding	Draft	17 yrs.	1740	39	18	104	70	
170	Gelding	Cavalry	18 yrs.	1100	35	15	90	58	
171	Gelding	Artillery	18 yrs.	1180	40	12	98	60	
172	Gelding	Cavalry	18 yrs.	1150	31	11	97	68	
173	Gelding	Saddle	18 yrs.	800	30	10	118	82	
174	Gelding	Artillery	20 yrs.	1300	33	10	102	60	
175	Gelding	Saddle	20 yrs.	900	41	12	93	62	
176	Gelding	Saddle	20 yrs.	1000	40	18	126	90	
177	Gelding	Saddle	20 yrs.	850	38	10	99	70	
178	Gelding	Saddle	25 yrs.	1000	33	10	115	78	

lower than the systolic pressure. Probably by the auscultation method a little higher results could be obtained.

Definite age variation between the systolic pressure of young adult (4 years and over) and old (20 years and over) animals was found to be very indefinite. While some old animals show increased pressure (hypertension), others apparently remain normal. Here again it should be remembered that the number of old animals examined is small, and definite comparative readings cannot be given without further study. In the human family there seems to be a gradual rise of the blood pressure in most cases with age, although some individuals show little or no change from adult to old age. Doubtless the unnatural mode of living found among men and the ready response to external or environmental stimuli (emotional states, etc.) greatly accelerate and are responsible for hyper blood-pressure readings. Most likely the lesser variation in animals is due partly to less complexity of the central nervous system.

THR CLINICAL VALUE OF BLOOD-PRESSURE DETERMINATIONS IN HORSES

No detailed studies of blood-pressure values are available at this time. A few cases have been examined and the pressure found to be disturbed considerably.

Blood pressure represents the functional efficiency of the circu-

latory system. Consequently, unusual demands thrust upon the circulation are accompanied by a definite variation from normal. In normal animals exercise greatly increases the arterial blood pressure. This is shown in the following readings: A sorrel

TABLE III—*Data on female animals*

No.	Sex	Type	Age	Weight (lbs.)	Pulse	Resp.	Systolic Pressure	Diastolic Pressure	Remarks
1	Mare Colt	Saddle	4½mos.	300	68	18	84	50	
2	Mare Colt	Artillery	6 mos.	450	62	18	82	50	
3	Mare Colt	Saddle	1½ yrs.	600	50	17	90	65	Nervous
4	Mare	Draft	2 yrs.	1250	40	13	97	70	Nervous
5	Mare	Draft	2½ yrs.	1300	40	18	97	68	Nervous
6	Mare	Cavalry	3½ yrs.	1100	38	17	85	54	
7	Mare	Cavalry	5 yrs.	1100	34	12	98	62	
8	Mare	Saddle	5 yrs.	1000	32	14	102	78	Nervous
9	Mare	Cavalry	5½ yrs.	1050	37	17	90	56	
10	Mare	Cavalry	5½ yrs.	1050	40	16	92	60	
11	Mare	Cavalry	6 yrs.	1100	35	18	90	50	
12	Mare	Cavalry	6 yrs.	1000	32	15	116	80	Nervous
13	Mare	Draft	6 yrs.	2000	36	13	82	43	
14	Mare	Cavalry	6 yrs.	1100	37	10	98	65	
15	Mare	Artillery	6 yrs.	1200	40	14	95	60	
16	Mare	Cavalry	6 yrs.	1050	35	15	86	50	
17	Mare	Cavalry	7 yrs.	1050	38	16	92	65	
18	Mare	Cavalry	7 yrs.	1100	30	13	90	59	
19	Mare	Cavalry	7 yrs.	1035	38	13	86	58	
20	Mare	Saddle	7 yrs.	1000	46	14	94	62	
21	Mare	Artillery	7 yrs.	1150	40	12	89	50	
22	Mare	Artillery	7 yrs.	1200	43	14	87	60	
23	Mare	Draft	7 yrs.	1400	40	12	92	55	
24	Mare	Draft	7 yrs.	2250	39	17	98	55	
25	Mare	Draft	8 yrs.	1290	40	17	84	50	
26	Mare	Artillery	9 yrs.	1150	36	11	89	56	
27	Mare	Saddle	9 yrs.	1000	47	26	110	74	Nervous
28	Mare	Draft	10 yrs.	1700	36	12	98	67	
29	Mare	Draft	10 yrs.	1300	36	18	90	60	
30	Mare	Draft	10 yrs.	1200	32	16	89	60	
31	Mare	Draft	10 yrs.	1150	30	18	94	58	
32	Mare	Draft	10 yrs.	1250	38	20	90	60	
33	Mare	Draft	10 yrs.	1200	36	15	88	55	
34	Mare	Saddle	10 yrs.	1000	40	15	85	50	
35	Mare	Saddle	10 yrs.	800	38	18	89	52	
36	Mare	Draft	12 yrs.	1300	34	14	98	57	
37	Mare	Cavalry	14 yrs.	1050	42	14	94	60	
38	Mare	Saddle	14 yrs.	900	36	10	86	60	
39	Mare	Cavalry	15 yrs.	1100	30	10	80	45	Anemic
40	Mare	Cavalry	16 yrs.	1060	34	12	90	56	
41	Mare	Cavalry	17 yrs.	1055	28	13	89	58	
42	Mare	Saddle	17 yrs.	950	40	15	89	60	
43	Mare	Saddle	17 yrs.	1100	40	12	95	68	
44	Mare	Draft	18 yrs.	1500	34	19	92	50	Pregnant
45	Mare	Draft	20 yrs.	1250	29	13	115	84	
46	Mare	Saddle	25 yrs.	1000	30	17	88	50	Fine condition

mare, 9 years, weighing 1000 pounds, with a normal systolic pressure of 106 and diastolic 70, following a mild exercise consisting of a minute fast walk, showed systolic pressure 120, and diastolic 78; another, a gelding, 20 years, weighing 800 pounds, with normal systolic pressure 118 and diastolic 82 after 2 minutes mild exercise, showed systolic pressure 126 and diastolic 100; still another, a young half-Arabian nervous stud, saddle-broken, 3 years, weighing 800 pounds, with a normal systolic pressure 117, diastolic 80, following a half-minute of fast running, showed systolic pressure 130 and diastolic 98. Following extreme fatigue the blood pressure was found to be lower than normal. Excitement associated with fright and other related disturbances considerably increased the pressure. After eating there was found a slight rise in the pressure above that of normal.

The blood-pressure variation in response to a given stimulus is considerably greater in the abnormal animal as compared to the normal. This is especially true when certain infectious materials or products, the toxins of germ origin are found in abundance throughout the body. It may be that this disturbance is partly due to the instability of the heat-regulating and vaso-motor mechanism associated with certain blood-pressure changes. As an example of this condition a very good case was available in the hospital clinic. A dark bay mare, weighing 800 pounds, 9 years old, was brought to the hospital, May 14, 1930, with a severe wire cut which severed the great metatarsal artery and ruptured the joint capsule. The wound was badly infected, with very little hope of recovery. Examination of the circulatory system revealed the following disturbances: pulse 60, respiration 48, temperature 102.5, systolic pressure 155, diastolic 135, heart rapid, bounding, slightly irregular pulse. Normal blood pressure of this animal was not available. Several readings were made throughout the day and part of the evening, but were discontinued at night. The blood pressure remained high with slight fluctuation. Towards morning, May 15, 1930, the animal died. The cause of death was pronounced to be general septic infection. Unfortunately no blood pressure was taken some hours before death, but keeping in mind the clinical picture of this animal there must have been a failure of the myocardium and with this a rapid decline of the arterial blood pressure.

In some circulatory disturbances the diastolic pressure may be too high as compared to the systolic, resulting in tremendous increase in the work of the heart. Cardiac compensation must

CHART 1. Blood pressure readings in male animals (colts, geldings and stallion.)

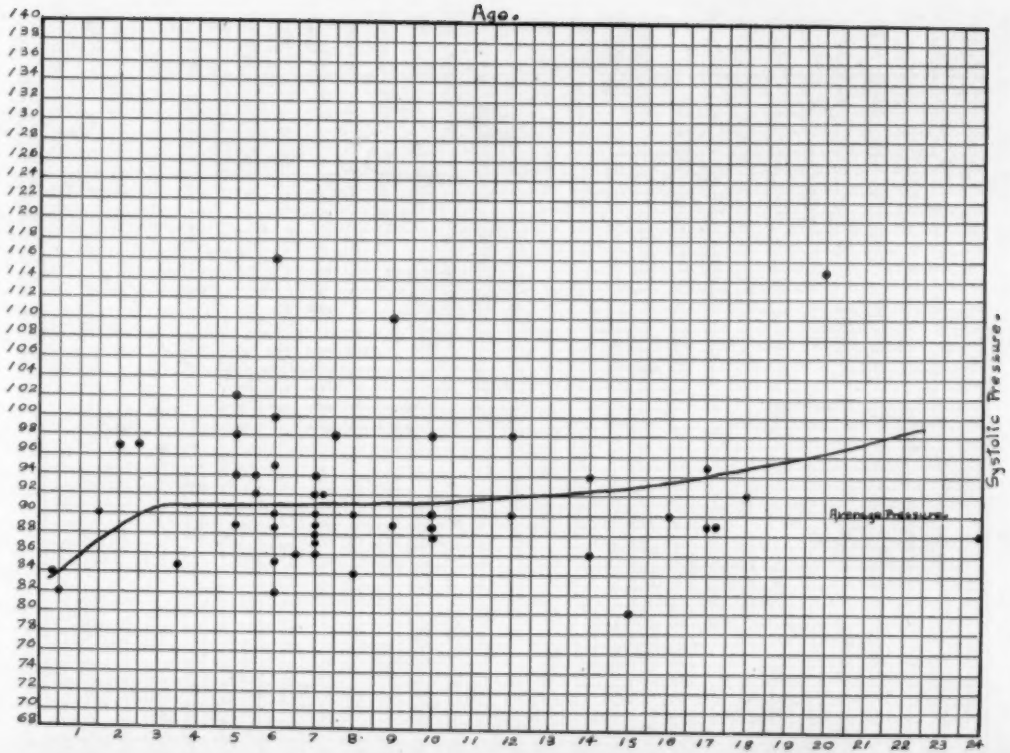

CHART 2. Blood pressure readings in mares.

necessarily follow with hypertrophy or cardiac dilatation and paralysis may supervene. Under such conditions the heart is required to pump against high diastolic pressure of the arteries. Functional disturbances which cause increased vascular tone with increased resistance to the peripheral circulation are bound to elevate the blood pressure.

According to Newburgh and Minot, in man rapid falling of systolic pressure, especially when accompanied by marked increase in the heart rate, may be indicative of very grave circulatory disturbance. In surgical cases, during and following operations, during anesthesia, renal diseases, pneumonia, severe gastro-enteritis, obstructions of the intestine, rupture of the stomach and many other conditions the determination of blood pressure might be of great value. This, however, must be carefully worked out from the clinical standpoint so that the general practitioner may have some basis from which he can obtain valuable information of the conditions of the circulatory mechanism.

In physical examinations of animals for soundness the taking of blood pressure should be a standard procedure. Blood-pressure determination is just as important in the examination of animals for insurance as when man is examined for life insurance. Many circulatory changes, especially those of blood-vessel origin, may be detected with the aid of sphygmomanometric determinations of the arterial blood pressure, for example, degenerative changes of the aortic wall. This is one of the practical methods of examining the circulatory apparatus which has been overlooked in the past. Roderick* states: "Unfortunately, we have no simple, repeatable clinical method of measuring bovine blood pressure."

Summary

A method is described for taking the blood pressure of the horse.

The normal blood pressure was determined on 224 apparently healthy animals. Systolic pressure in geldings and stallions fluctuated between 90 and 104 millimeters of mercury with an average of 98, while in the mare it fluctuated between 86 and 98 millimeters with an average of 90. The number of mares examined was somewhat smaller than the number of males, but a

*The pathology of sweet clover disease in cattle. Jour. A.V.M.A., lxxiv (1929,) n. s. 27. (3) pp. 314-326.

Chart 2. Blood pressure readings in mares.

consistently lower reading was obtained in the female. The effect of castration, if any, was not determined.

Diastolic pressure was variable with a difference of from 30 to 45 millimeters of mercury lower than systolic pressure.

Practical application of blood pressure determinations in animals is discussed. This work is still in progress.

Honoring Mr. Whittlesey

Mr. James M. Whittlesey, of Morris, Conn., former Commissioner on Domestic Animals of Connecticut, and an honorary member of the A. V. M. A., was given "Honorary Recognition" by the Connecticut Agricultural College, at Farm and Home Week, August 6, 1931. "Honorary Recognition" is given to leaders in agriculture and rural life, selected each year by a special committee of the College Faculty and approved by the Board of Trustees. This custom, borrowed from Wisconsin, was started in 1924. To date twenty-three persons have been so honored.

Convention Notes

Tennessee was credited with six veterinarians in attendance: Drs. W. M. Bell, Nashville; L. G. Brown, Franklin; D. Coughlin and M. Jacob, Knoxville; W. B. Lincoln, Morristown; and O. B. Neely, Winchester.

Kentucky was among the states having an even half-dozen at the convention: Drs. E. P. Farley, Paducah; Frank Hare and E. M. Stemmler, Lexington; F. H. Riester, Buechel; V. T. Rose, Elkton; and C. E. Stockton, Versailles.

Arkansas sent seven members of the profession to Kansas City. These were: Drs. Joe H. Bux, F. R. Osborn, P. A. Johnson and Rease Mitcham, Little Rock; Walter Martin, Jonesboro; N. J. Pearce, Fort Smith; and R. W. Williams, Eldorado.

Colorado contributed to the record-breaking attendance figure, with sixteen members and visiting veterinarians: Drs. A. N. Carroll, Pueblo; George H. Carr, Brighton; Floyd Cross, J. Farquharson, Geo. H. Glover, H. E. Kingman and B. R. McCrory, Fort Collins; H. C. Evers, A. A. Hermann, J. N. Huff, E. A. Meyer, G. G. Miller and G. H. Oliver, Denver; N. J. Miller, Eaton; C. L. Nelson, Kiowa; and H. R. Niehaus, Holyoke.

THE RESULTS OF FEEDING VARIOUS MEMBERS OF THE COLON-TYPHOID-ENTERITIDIS GROUP OF ORGANISMS TO ANEMIC AND NON-ANEMIC PIGS*

By J. F. BULLARD, *Lafayette, Indiana*

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An interesting subject that confronts many investigators of animal diseases is the variation in resistance to infection which exists in different animals. Many investigators have worked on the theory that faulty nutrition, including starvation and avitaminosis, is an important factor which renders animals suffering from this condition less resistant to infection than normal animals.

Findlay[1] concluded that guinea pigs suffering with chronic scurvy were less resistant to bacterial infections than control animals. The same author[2] showed that pigeons which were fed diets lacking in vitamin B became more susceptible to infections with pneumococcus and meningococcus, organisms to which they are naturally quite immune. They were also more susceptible to infections with *B. coli* and *B. enteritidis*. Werkman[3] used rats, rabbits and pigeons, and found that these animals suffered a marked break in their resistance to infection when suffering from pronounced vitamin deficiency. Observations similar to the above were made by Smith.[4] He stated that pneumonia in guinea pigs due to pneumococcus and *B. bronchisepticus* was more prevalent in the winter months when no green feed was used. Rosenow[5] showed that the susceptibility of guinea pigs to the action of toxins was increased by starvation.

Craig[6] reported that anemic pigs were highly susceptible to subcutaneous injections of material from cases of bull-nose, while non-anemic pigs receiving the same material showed no lesions. With the idea that other factors than faulty nutrition may often result in lowered resistance, it was decided to investigate anemia in pigs as a possible factor, as this disease in young pigs, two to four weeks of age, is extremely devitalizing.

*The data included in this paper were presented as part of a thesis for a Master's degree at the Kansas State Agricultural College, in 1930. Received for publication, May 19, 1931.

Therefore experiments were carried out in which anemic and non-anemic pigs were used as subjects. Various members of the colon-typhoid-enteritidis group were fed to these animals.

Experimental

Seventy pigs, fifty-four anemic and sixteen non-anemic, were divided into several lots. Each lot was kept in a separate concrete pen. *Salmonella aertrycke, Salmonella enteritidis, Salmonella suipestifer* and *Escherichia coli* were the organisms which were fed.

S. aertrycke was fed to thirteen anemic and four non-anemic pigs and *S. enteritidis* to fifteen anemic and five non-anemic. Twenty-six pigs were in the *S. suipestifer* group. Seventeen anemic and seven non-anemic were fed this organism, while two other anemic pigs were allowed to remain with the group but were not fed. Only seven anemic pigs received *E. coli;* no non-anemic pigs were available for the feeding of this organism.

From each organism used for feeding, an antigen was prepared. The agglutination test was applied before any of the organisms were fed, four separate tests being used on each pig.

The organisms were grown in broth eighteen hours and were introduced directly into the stomach by the use of a stomach-tube and glass syringe. Separate equipment was used for each species of organism fed. Blood samples for the agglutination test again were taken, commencing two to three days after feeding the organisms, and the taking of samples continued at these intervals up until the time the pigs died or were killed. Pigs which survived were killed at approximately thirty days after feeding.

All pigs were examined carefully for lesions of anemia and for lesions that might occur as a result of feeding the organisms. The heart, liver, spleen and cecal lymph-gland of each pig were cultured. All organisms isolated were subcultured and examined morphologically and bacteriologically. Carbohydrate fermentations were included in order to classify and compare them with the stock cultures used.

As an independent feature of this work, the agglutinin-absorption test was used as a further check on the identification of the recovered organisms. The absorbed serum was prepared much in the same way as Andrews[7] prepared his mono-specific serum. The sera used were from two pigs that had been fed *S. aertrycke* and *S. suipestifer* respectively and whose titres before death were

1:500 for the former and 1:1000 for the latter. This method of preparing immune serum was tried purely as an experiment to see whether it would be satisfactory for agglutinin-absorption tests.

Five cubic centimeters of the *S. aertrycke* serum was placed in a sterile bottle and a similar amount of *S. suipestifer* serum in a second. To the *S. aertrycke*, 45 cc of a very heavy suspension of *S. suipestifer* was added, and to the *S. suipestifer* the same amount of a very heavy suspension of *S. aertrycke*. After incubating them for forty-eight hours, during which time they were shaken frequently, they were centrifuged until all bacteria were thrown down. Each lot of serum was then tested to determine if absorption was complete. These two sera were used against antigens made from each of the isolated organisms and the stock culture antigens in dilutions of 1:50, 1:100, 1:200 and 1:500. This test was used to differentiate *S. aertrycke* and *S. suipestifer* as cross-agglutination exists between these two organisms.

Results

The preliminary agglutination tests, before any feeding of cultures, revealed that sera from only three of the seventy pigs were positive with any of the four antigens used. These were anemic pigs. Two pigs were positive for *S. suipestfier* in dilutions of 1:20 and 1:100 respectively, while the third one caused an agglutination in a 1:20 dilution with *E. coli* antigen.

In summarizing results for agglutination tests after feeding, certain exceptions not included in the summary may be noted. One anemic pig fed *S. aertrycke* and five anemic pigs fed *S. enteritidis* died shortly after feeding; "hog flu" was the apparent cause of death. Another anemic pig (69) of the *S. enteritidis* group failed to show agglutinins at any time, as did two pigs of the *E. coli* group. Three anemic pigs of the *S. suipestfier* group died

Table I—*Time of appearance of agglutinins*

Organism	Anemic Pigs		Non-Anemic Pigs	
	Number	Days (Average)	Number	Days (Average)
S. aertrycke	12	6.8	4	11.5
S. enteritidis	9	4.9	5	8.0
S. suipestifer	14	5.2	6	6.0
E. coli	5	2.4	....	....

before the average time required for appearance of agglutinins, this organism being the apparent cause of death in these three pigs.

A summary of the average time necessary for agglutinins to appear in each group is shown in table I.

These results, when stated in terms of the number of pigs showing agglutinins on a given day, are as follows:

S. aertrycke: 12 anemic: all by the 8th day; 7 of 12 by the 6th day. 4 non-anemic: one by the 8th day.

S. enteritidis: 9 anemic: all by the 6th day; 5 of 9 by the 4th day. 5 non-anemic: all on the 8th day.

S. suipestifer: 14 anemic: 12 by the 6th day; 5 less than 6 days. 6 non-anemic: all by the 6th day; 4 of 6 by the 4th day.

E. coli: 5 anemic: all by the 3rd day.

It will be noted that in the groups of pigs receiving *S. aertrycke* and *S. enteritidis*, agglutinins appeared considerably earlier in anemic than non-anemic pigs. In the groups fed *S. suipestifer* there was no significant difference in times of appearance of agglutinins in anemic and non-anemic subjects. Agglutinins for *E. coli* appeared distinctly earlier on the average in the anemic pigs fed *E. coli* than was true for the other organisms fed to the other groups. However, agglutination occurred only in low dilutions.

A comparison of agglutinating titres showed the greatest difference in groups fed *S. aertrycke* and *S. enteritidis*. In both groups distinctly higher titres were found for anemic than non-anemic pigs. No significant differences were noted for *S. suipestifer*-fed pigs.

Cross-agglutination was most evident in the pigs fed *S. aertrycke* and anemic pigs of the group showed an earlier appearance of the minor agglutinin (*S. suipesifter*) than did the non-anemic controls. Only one pig of the group, a non-anemic control, failed to show agglutinins for *S. suipestifer*.

In the group of pigs fed *S. suipestifer*, cross-agglutination, especially in the anemic pigs, was not so evident as in the *S. aertrycke* group. Of fourteen pigs fed *S. suipestifer* and showing agglutinins for that organism, only six showed agglutinins for *S. aertrycke*, the minor agglutinin. However, agglutinins for *S. aertrycke* appeared in all six of the non-anemic pigs of the group.

The group of pigs fed *S. suipestifer* presented a number of interesting results. *S. suipestifer* was the only organism fed that was pathogenic. Of the twenty-four pigs receiving this organism,

eighteen died at intervals ranging from two to twelve days after feeding; one pig of this group, accidentally injured on the second day after feeding, was destroyed. All of these were positive on culture and all except three anemic pigs showed extensive intestinal lesions. The five pigs remaining, two anemic and three non-anemic, were destroyed on approximately the thirtieth day after feeding. These were negative on culture and only one, a non-anemic pig, showed lesions.

It has been noted that two anemic pigs were not fed *S. suipestifer* but were allowed to remain with the group receiving it. Agglutinins for both *S. suipestifer* and *S. aertrycke* appeared simultaneously on the tenth day in one of these pigs. In the second pig, agglutinins for *S. suipestifer* appeared on the sixteenth day. *S. aertrycke* agglutinins did not appear in this case.

These pigs were destroyed on the thirty-fourth day after feeding of the organism to the rest of the group. All organs were found to be sterile and no lesions of colitis were present. The fact that they developed agglutinins probably indicated that, although they picked up enough infection to cause the reaction, still not enough organisms were present to produce lesions.

As previously noted, all pigs were examined for lesions after death or destruction and the organs were cultured. Intestinal lesions were found only in the group of pigs which were fed *S. suipestifer*. Lesions were more regularly and uniformly produced by this organism in anemic than non-anemic pigs.

Of the seventy pigs there were twenty-nine which gave positive cultures. *S. aertrycke* was isolated once, *S. enteritidis* seven times and *S. suipestifer* twenty-one times. These twenty-nine strains were classified according to morphological and bacteriological characteristics and were found to agree in these characteristics with the stock cultures used in feeding. Results from the agglutinin-absorption test correlated with these findings.

Summary

The presence of agglutinins for various members of the paratyphoid-enteritidis group of organisms is comparatively rare in the blood serum of young pigs.

After the feeding of *S. aertrycke* and *S. enteritidis*, agglutinins appeared earlier in anemic than non-anemic pigs. This is probably due to the ability of the organisms to penetrate the intestinal mucosa as a result of lowered resistance caused by anemia.

S. aertrycke and *S. enteritidis* were non-pathogenic for all pigs while *S. suipestifer* was extremely virulent.

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[6]Craig, R. A.: Anemia in young pigs. Jour. A. V. M. A., lxxvi (1930), n. s. 29 (4), p. 538.
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New Sanitary Officials in California

Dr. Joseph J. King, formerly of San Diego, has been appointed to head the Division of Animal Industry of the California Department of Agriculture, succeeding Dr. J. P. Iverson, who was connected with the Department for over twenty years. Dr. Theodore Boyer, of Los Banos, has been appointed Chief of the Bureau of Dairy Control, succeeding Dr. M. E. McDonald, who has been made Chief of the Bureau of Tuberculosis Control. Dr. A. G. Boyd is Assistant Chief, Division of Animal Industry. The August issue of the *Monthly Bulletin*, published by the California Department of Agriculture, was devoted entirely to articles dealing with veterinary activities conducted by the Department.

The following editorial appeared in the August 4 issue of the *California Woolgrower:*

> The removal of Dr. J. P. Iverson as Chief of the Division of Animal Industry, State Department of Agriculture, the position which he has held for some thirteen years and prior to that, assistant in the Division for some eight additional years, takes from the public service to the live stock and meat industry of California, a man honored and beloved by all sheepmen. It has been his energy, ability and vision that has done so much to secure for California sheepmen what is considered by competent authorities to be the most efficient and satisfactory method of inspection, eradication and control of sheep diseases found in any state of these United States.
>
> The day was never too long—the job never too big for Dr. Iverson to tackle and bring to a successful conclusion. He inspired loyalty in his men. His fairness to all, his ingrained honesty of purpose and deed, has set a high standard for public service.
>
> It is needless to say that the Board of Directors, California Wool Growers Association, at its last meeting, voted unanimously urging that Dr. Iverson be retained as Chief of the Division of Animal Industry.
>
> Dr. Iverson's departure is a great loss to the live stock industry not only of this State but to the West, for his influence in regulatory matters affecting the health of animals was more than state-wide in scope.

The Board of Supervisors of Stephenson County, Illinois, declined to reëngage a county veterinarian, by a vote of 15 to 11, at a recent meeting. The voting was by secret ballot. Why?

THE VALUE OF STERILE BACTERIAL SUSPENSIONS AND STERILE BROTH CULTURES IN PREVENTING THE DEVELOPMENT OF LESIONS IN SMALL PIGS ATTRIBUTABLE TO SALMONELLA SUIPESTIFER

A Preliminary Report*

By J. F. BULLARD, *Lafayette, Indiana*

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In this experiment, seventeen small pigs approximately four weeks of age were used. The organism fed was a strain of *S. suipestifer* that had previously been shown[1] to be pathogenic for pigs of this age.

The object of the present work was to determine if any protection could be acquired against *S. suipestifer* by injecting pigs subcutaneously with sterile, phenolized saline suspensions of the organism or by feeding formolized killed broth cultures before feeding the living organisms.

EXPERIMENTAL

The seventeen pigs were divided into three lots. Lot I consisted of five pigs (99, 100, 101, 102 and 104), lot II of six (47, 49, 50, 85, 105 and 106) and lot III of six (48, 51, 78, 82, 91 and 97).

Three of the five pigs in lot I received 20 cc of a living culture of *S. suipestifer* and two pigs (99 and 100) received no culture. This lot is referred to as the control lot.

All pigs in lot II received subcutaneous injections of a phenolized saline suspension of the same strain of the organism as was used in lot I. This suspension was adjusted to conform to tube two of the McFarland nephelometer. Pigs 47 and 49 received 5 cc, pigs 50 and 85 received 10 cc, and 20 cc was given to the two remaining pigs (105 and 106).

Pigs of lot III were given a killed broth culture of the same organism. This culture was rendered sterile by the addition of 0.25 per cent of formalin. After being tested for sterility, 50 cc was given to two pigs (48 and 51) and 75 cc to the remaining four (97, 78, 82 and 91). In all cases where the organisms were fed,

*Received for publication, May 19, 1931.

they were injected directly into the stomach by using an all-glass syringe and a stomach-tube.

Agglutination tests were applied before the experiment started, and at intervals of several days during its course, to determine whether agglutinins were being formed.

On the 16th day, pigs in lots II and III were given 20 cc of a living culture of the same organism. Agglutination tests were continued as before and observations recorded on all pigs. Pigs that died during the experiment and those that were destroyed were autopsied and examined. Bacteriological examinations were made by culturing the heart, liver, spleen and cecal lymph-gland of each.

Results

Two pigs (102 and 104) of the three receiving the culture in lot I died on the third day and the other pig (101) on the seventh day. There were no lesions of colitis in the first two, as they died before visible lesions had time to develop. The third one showed a considerable amount of colitis. All three were positive on bacteriological examination. The remaining two pigs in this lot (99 and 100) were killed on the 16th day. Both were negative and showed no lesions. There was no agglutination at any time with pigs 101, 102 and 104, while on the day of destruction the other two (99 and 100) showed partial agglutination in the 1-10 and 1:100 dilutions respectively.

In lot II there was about 75 per cent agglutination for all pigs on the fifth day after the injection. All pigs in this lot were normal and appeared healthy during this part of the experiment.

The pigs in lot III showed some variation in the appearance of agglutinins. On the fifth day, pigs 48 and 78 showed about 75 per cent agglutination up to the 1:100 dilution, pig 91 partial in 1:50, and pig 97 only very slight agglutination in the 1:10 dilution. The two remaining pigs (51 and 82) were negative. On the sixth day, pig 91 died. A slight pneumonia was all that was detected on postmortem. All organs were negative. The remaining five pigs remained normal up to this time. Ten days later, or sixteen days in all, after the dead cultures were fed to pigs in lot III, pig 78 of this same lot was off feed and was destroyed. This occurred on the same day that the living organisms were fed. No visible lesions of colitis were present in this pig but all cultures were positive. Serum caused nearly a complete agglutination, including the 1:100 dilution.

On the day the living culture was fed to ten pigs, now in lots II and III, blood samples were taken, and again on the 7th, 11th, 15th, 21st and 27th days. In lot II all pigs remained healthy with two exceptions; pig 47 scoured slightly on the 11th day but soon recovered; pig 106 was scouring badly on the 15th day, was off feed and emaciated. It was destroyed and extensive colitis was found. All cultures remained sterile. The five remaining pigs in this lot continued to be healthy and all were destroyed on the 27th day. Upon autopsy no intestinal lesions were found in any of these pigs. Bacteriological examination revealed positive cultures in only two cases (47 and 49). The cecal lymph-glands of each of these two pigs were positive; all other cultures were negative. One of these two (47) was the pig which scoured on the 11th day. At the end of the experiment, these five pigs (47, 49, 50, 85 and 105) gave complete agglutination in 1:100 dilutions; partial (up to 1:2000) in four (47, 49, 50 and 105) and 1:500 in one (85). Pig 106, which was destroyed on the 15th day, gave partial agglutination in 1:100 and complete in 1:200.

On the 15th day, pig 48 in lot III was scouring, off feed and was becoming emaciated. It was killed and on examination no colitis could be found. Cultures were taken and all proved to be negative. Serum from this pig caused a partial agglutination in the 1:200 tube. The three remaining pigs (51, 97 and 82) showed a slight, gradual increase in their titre and were destroyed on the 27th day. These three were healthy throughout the experiment. All cultures were negative and no lesions were seen. In one of them (51) agglutination was complete in 1:100 and partial in 1:1000. Of the two remaining pigs (97 and 82) both showed partial agglutination, the former in a 1:50 dilution and the latter in 1:100.

Morphological and cultural characteristics including carbohydrate fermentations showed five of the six organisms isolated to be *S. suipestifer*. One (104) of the first two pigs to die in lot I proved to have a generalized *E. coli* septicemia. This organism was isolated from all organs cultured.

A sample of serum was saved from pig 50 in lot II which gave a complete agglutination in 1:200 and partial up to 1:2000. This serum was used against six different antigens made from each of the organisms isolated from pigs 47, 48, 49, 101, 102 and 104. There was complete agglutination in all dilutions (1:10, 1:20, 1:50 and 1:100) with the first five; the sixth one (104) being negative. A sample of absorbed *S. suipestifer* serum used in

another problem[1] was run against these six antigens and the original antigen. There was complete agreement in these results when compared with the other tests just mentioned.

Conclusions

1. The injection of sterile, phenolized, saline suspension of *S. suipestifer* was the most rapid and reliable method of stimulating the production of agglutinins for this organism in young pigs, while the feeding of the formolized killed cultures was variable in this action.

2. The feeding of live cultures after the injection of the bacterial suspension or after the feeding of killed cultures did not materially increase the titre.

3. Lesions attributable to *S. suipestifer* were found in only one case out of six where a preliminary injection was carried out. *S. suipestifer* was not isolated from this case. However, it was isolated from the cecal lymph-glands of two other pigs in this group.

4. Pigs fed living cultures, after being fed killed cultures, showed no lesions of colitis. All organs of these pigs were sterile. One pig of this group, however, was positive when cultured. This occurred before the living culture was fed.

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Purdue University Veterinary Short Course

The Purdue University Veterinary Short Course, this year, will be held November 9-11, according to an announcement made by Dr. R. A. Craig, Chief Veterinarian. The first day will be devoted to poultry subjects, including a general poultry clinic. The second day will be given over to swine diseases, as well as swine sanitation, feeding and management. Dr. Robert Graham, of the University of Illinois, will discuss several important diseases of swine. On the third day, there will be a clinic for large animals, in charge of Dr. T. H. Ferguson, of Lake Geneva, Wis.

Mysterious Bee Disease

A mysterious disease has been killing large numbers of bees in the vicinity of Carson City, Mich. It is reported that the disease is characterized by a paralysis, and that entire colonies of bees have been wiped out by this disease.

STUDY OF ANTI-HOG CHOLERA SERUM AND VIRUS FOR THE PRESENCE OF BRUCELLA*

By I. FOREST HUDDLESON *and* HOWARD W. JOHNSON

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After finding that Brucella infection is a common disease in hogs in the state of Michigan, and that it is widely distributed in herds throughout the State, it appeared to us that in order to arrive at a satisfactory plan of control an effort should first be made to learn the means or routes by which the disease spreads from herd to herd. Its spread can hardly be due to any degree to the purchase of infected hogs, as is the case in cattle, as there is not so much traffic in hogs for breeding purposes as there is in cattle. On the average farm most of the sows used for breeding purposes are reared from birth.

In seeking modes of distribution of the disease, the thought came to us that if the organism was ever present in the blood of infected hogs and these hogs were used in the preparation of anti-hog cholera serum or virus, such material might serve as one of the sources of Brucella infection in hogs.

Since most manufacturers add phenol to serum and virus as a preservative and, in some instances, serums are also subjected to a pasteurization process, there is a possibility that the organism if present would be destroyed.

In order to determine whether *Brucella suis* will remain viable in the presence of phenol, serum and virus containing phenol in 0.5 per cent were obtained and a suspension of the organism added to them. These were placed at an ice-box temperature of 15° C. and cultured periodically to determine if the organism remained viable. In the case of the serum, it was found that *Br. suis* did not remain alive longer than two weeks. In virus, the organism appeared to multiply during the first four months. A reduction in the amount of growth began to take place after five months, and at the end of six months, it could no longer be obtained in culture. This experiment was repeated with approximately the same results. It is therefore evident that *Br. suis* will remain

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viable in hog cholera virus in the presence of phenol for a considerable period of time.

The question of whether commercial serum and virus sold for immunization purposes contain *Br. suis* can be answered only by repeated bacteriological examinations of these agents. In June, 1930, the writers began the examination of samples of commercial serums and virus with this purpose in mind.

From 23 manufacturers samples from 30 serial lots of clear serum, 16 serial lots of whole-blood serum and 24 serial lots of virus were obtained for examination. Each lot of serum or virus usually represents the pooled blood of several hogs.

The methods of examination consisted in streaking the sample heavily over beef-liver-agar plates directly from the manufacturer's container. The centrifuged sediment from a 5-cc sample of each was cultured in the same manner. The inoculated plates were incubated both aerobically and in CO_2. In addition, 39 samples of virus and whole blood serum were injected subcutaneously into guinea pigs in 1-cc amounts. A period of six weeks was allowed to elapse before the pigs were examined bacteriologically and serologically for the presence or absence of Brucella infection. Most of the samples that were injected into guinea pigs were so heavily contaminated with other bacteria that it was impossible to detect the presence of Brucella by direct bacteriological examination.

The examinations, both bacteriological and animal inoculation, failed to reveal the presence of Brucella in any of the samples of serum and virus.

Thinking perhaps that there might be a seasonal difference in the occurrence of *Br. suis* in the blood of naturally infected hogs, another search was made for the organism in samples of serum and virus during the period from December, 1930, to March, 1931. During this time 35 manufacturers supplied us with samples from 43 serial lots of whole-blood serum, 1 serial lot of clear serum and 59 serial lots of virus. Besides the bacteriological examinations that were conducted, 24 samples were injected into guinea pigs. Again, in not a single sample could the presence of Brucella be detected.

In addition to the examination of commercial anti-hog cholera serum and virus, the writers have made an effort to determine whether *Br. suis* occurs in the blood of hogs reacting to the agglutination test in high titre. In some instances the samples were collected from hogs while alive and in others they were

collected at the time of slaughter. In many of the latter hogs *Br. suis* was cultured from such tissues as the spleen or lymph-nodes.

In all instances the blood was injected subcutaneously into a guinea pig in a 1-cc amount. Altogether, samples of blood from 100 hogs have been examined in this way, but in not a single instance have we succeeded in finding *Br. suis* present.

Summary

A search has been made of 31 serial-lot samples of clear anti-hog cholera serum, 43 serial-lot samples of whole-blood serums and 59 serial-lot samples of hog cholera virus for the presence of viable *Br. suis*. The samples were collected in two seasons of the year, summer and winter, and came from widely distributed manufacturers.

In not a single sample of serum or virus could viable *Br. suis* be detected, either by bacteriological examinations or animal inoculations.

Whole-blood samples from 100 hogs on farms in Michigan that reacted to the agglutination test in high titre have been examined for the presence of *Br. suis*. The examination of these samples failed to reveal the presence of the organism.

Although it cannot be said with a certainty that *Br. suis* never occurs naturally in commercial anti-hog cholera serum and virus, the foregoing examinations would strongly indicate that the possibility of its presence in a living state at the time of distribution is *rather* remote.

We wish to thank all of the manufacturers of serum and virus for their kindness in supplying us with the materials which made this study possible.

Discussion

Dr. E. A. Cahill: Nearly two years ago, we conducted tests on approximately one hundred lots of serum and virus to determine this same point. We adopted this first method reported by the authors, and seeded serum and virus with abortus organisms. In our work we used a suspension containing 20 billion organisms. In no instance were we able to recover viable organisms from serum after ten days nor from virus after two weeks. To that extent our results varied from that of the authors who, I believe, mentioned four months.

Our research on this subject has not been available except to the Bureau of Animal Industry. We referred it to the Bureau some time ago, when there was under consideration a regulation which would cause all animals used in serum production to be tested for abortion disease. I believe the work presented here should be of considerable interest in the consideration of any such regulation. It is a very distinct contribution to our knowledge on the subject.

Dr. C. P. Fitch: I wish to report that in our studies on Bang's disease in cattle we have examined the blood of seventeen cattle, both preceding and following the act of abortion. We have used in our experiments much larger quantities of blood than have been reported from swine and have isolated the organism only four times from three animals.

PASTY EYES IN DUCKLINGS*

By H. J. STAFSETH, *East Lansing, Mich.*

Michigan State College

In the winter of 1931, the writer was asked to come to a large duck-raising establishment for the purpose of diagnosing and, if possible, prescribing curative or preventive measures for a rather serious outbreak of a disease in ducklings. The owner used the terms "watery eyes," "pasty eyes" or "scaly eyes" in discussing the ailment and stated that this malady is very likely a well-known one to duck-raisers, that is as far as symptoms are concerned. A search through literature on duck diseases failed to reveal any description of a disease that might be identical with the one under discussion. To be sure, infectious, septicemic diseases of ducks, in which watery or purulent discharge from the eyes may occur, have been described, but, as will be shown later, the condition about to be described did not seem to be of an infectious nature.

SYMPTOMS

There seemed to be evidence of faulty development of the embryo, since a considerable number of the ducklings failed to break through the shell. They would "pip" but got no farther and died in the shell. Some ducklings, dead in the shell, showed watery or even pasty eyes. A considereble number of ducklings that were strong enough to free themselves from the shells showed "small eyes," watery eyes or pasty eyes. Very few of them developed watery eyes and pasty eyes after having gotten an apparently fair start in life. The eye affliction always started with a rather profuse watery discharge, which gradually became mucous in character, causing the eyelids to stick together, after which a crust formed over the margins of the eyelids. When the eyelids were opened and the eyes washed out there was little or no visible injury to the eye. No discharge was noticed from the nostrils nor were there any swellings about the head such as one sees in roup or fowl-pox. There were no diphtheritic or cankery patches in the mouth or trachea nor was there any evidence of dyspnea. Weakness was a prominent symptom and was seen at the time of hatching or soon thereafter. It was

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thought that the inability to see prevented them from finding feed and water, thus contributing to the rapid development of weakness.

Duck-raisers refer to "buttons" on ducklings. This means that the navel has failed to close properly. Most of the ducklings examined showed this defect. During the outbreak of this disease seventy-five to one hundred ducklings died or were removed, due to illness each day. Under normal conditions only two to four per five or six hundred ducklings died or were removed up to five weeks of age.

Postmortem Findings

Besides the inflammatory changes found in the conjunctiva, some signs of inflammation were found in the infraörbital sinuses. The livers were normal in size and usually light yellow in color. Only in one duckling was the liver congested. Petechiae were found in the livers of four out of twelve ducklings that had suffered from the disease for several days. The kidneys were pale in most of the ducklings, a few of them showing injected vessels. Some congestion was noticed in the lungs of a little less than one-half of the ducklings examined and about one-half of them showed slight signs of pericarditis.

Bacteriological Examination

Cultures were made from eggs, ducklings dead in the shell and other ducklings in various stages of the disease. In all, more than three dozen specimens were examined, all with indifferent results. The plates were either sterile or they showed contaminating organisms. A few colonies that looked as if they might deserve closer examination were fished. From these *Escherichia coli* was obtained four times and a paratyphoid B type twice.

Transmission

Attempts were made at transmitting the disease to twelve healthy ducklings by the means of cultures, exudate and tissue suspensions but not even the slightest symptom of disease developed in any of them.

Serological Tests

Agglutination tests with blood of diseased ducklings and antigens of *Salmonella pullorum* were all negative.

Treatment

All attempts at proving the presence of an infectious, communicable agent having failed, it was thought logical to look into the

nutritional factor. The ration fed to the breeding stock was well balanced in all respects with the exception that it might be low in vitamins A and D, since it contained no cod-liver oil and a rather small amount of yellow corn. Cod-liver oil, therefore, was added, mixing one gallon per ton at the mill and in addition one quart per one hundred pounds was used during the first week and one pint per one hundred pounds during the second and third weeks. An increase was made also in the amount of corn. Eggs gathered during the first week began to hatch better and a marked improvement was noticed during the second week, after which the trouble disappeared.

Cause

Our experience with this ailment is too limited to justify any definite statements as to etiology. However, the negative results of our bacteriological work and the strikingly gradual and regular improvement following the change in the feed of the breeding stock suggest that this disease might be of nutritional origin, perhaps a vitamin-A or -D deficiency, or a combination of both. The fact that the eggs gathered during the early part of the season gave better results than those gathered later indicates that the amount of vitamins stored up was sufficient only for a short period of time. This view is supported also by the findings of Hart,[1] Hughes[2] and Bethke[3] and their coworkers, who found that yolks of eggs are rich in vitamin D and that the vitamin content depends upon the feed of the producing hen. It has been shown also by Hess[4] and his coworkers that lack of vitamin D in eggs causes faulty development of the embryo, which in turn leads to failure in hatching. Furthermore, a lack of vitamin A is apt to lead to lowered resistance to infection.

The fact that a very high standard of sanitation has always been maintained in the incubators, hatchery and brooders is another reason for feeling that the disease might be of a nutritional rather than an infectious nature.

Acknowledgment

The writer wishes to acknowledge the assistance of W. W. Thompson and C. G. Grey, of the Department of Bacteriology, and J. M. Moore, of the Department of Poultry Husbandry.

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[3]Bethke, R. M., et al: J. Biol. Chem., lxxii (1927), p. 595.
[4]Hess, A. F., et al: Proc. Soc. Exp. Biol. and Med., xxvi (1926), pp. 651-652.

PROTEIN POISONING IN SWINE

By W. B. CHAPMAN, *Leon, Iowa*

Protein poisoning, as it affects swine, is a condition that may be met occasionally and one that may be confused with the several septicemias common in these animals. Clinical symptoms and even postmortem lesions are often misleading and only after careful inquiry as to the feed and other history of the herd may the true condition be determined.

This toxic disorder is the result of consumption of highly nitrogenous foods or those exceedingly high in protein. By this overbalancing of the accustomed diet or the inability of the animal body properly to assimilate the increased amount of protein forced upon it, symptoms of protein poisoning become evident. The writer will endeavor to describe this condition as it occurred in two separate herds recently.

Herd 1 consisted of 50 head of Duroc-Jersey shoats, weighing around 150 pounds and several larger gilts. These hogs had been kept in a dry lot and were being fed a ration of corn and a shorts and oil meal slop. Two days previous to the time the herd was examined, they were allowed access to an alfalfa field for two or three hours daily.

The day this herd was observed, which was the first day that symptoms were noted by the owner, about half of them were off feed, some prostrated and showing temperatures of 105 to 106° F., part of them evidencing marked respiratory disturbances. One of the marked symptoms present was unmistakable laminitis in practically every hog affected. This was determined by the soreness of the feet and the refusal of the animals to stand very long at a time unless forced to do so.

In instituting therapeutic measures, these animals were confined in a dry lot, the diet restricted and Epsom salts given in the slop as a purge. Three days later the entire herd was back to normal except a slight soreness in the feet, which soon subsided.

Herd 2, which consisted of 40 head of shoats, was being fed practically the same and kept under the same environment as herd 1 except that they were being allowed free access to a clover pasture instead of alfalfa. About ten of these animals were affected at the time of examination and practically the same symptoms noted. One of the worst affected animals was posted, with the following findings.

Lymph-glands slightly congested; scattered petechiae on the serous covering of the lungs and intestines and a few on the kidneys. Some congestion of the lungs and increased bronchial secretions. The mucous surface of the duodenum was slightly inflamed and a light infestation with ascarids noted. Other organs seemed normal.

The same treatment was given this herd as the former, with the result of rapid recovery in all except one animal, which succumbed.

These two instances are cited as typical of the several cases encountered in the writer's practice this season and due to the similarity of symptoms and lesions to acute septicemias, it is well for the practitioner to be on the alert in diagnosing the condition. Vaccination of swine in this condition would undoubtedly result in disaster, as the result of introduction of more protein into an already saturated individual can be readily appreciated.

Aside from obtaining the history of the herd as regards to previous methods of feeding, the only symptom that might be considered pathognomonic is the accompanying laminitis which, as a rule, is invariably present. The mortality rate is apparently low, provided the condition is recognized in the early stages and the animals' diet restricted. The greatest tragedy lies in erroneously diagnosing the disorder acute hog cholera and administering the simultaneous treatment.

RABIES VIRUS AS AFFECTED BY CERTAIN DILUENTS*

By J. E. SCHNEIDER *and* L. SALEM

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Rabies virus 740 was obtained in the form of brain and spinal cord tissue from rabbits moribund seven days following subdural injection of fixed rabies virus. The tissues were ground to a

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fine pasty consistency in a mortar and the tissue virus was divided into three parts.

Part 1 was emulsified with a solution consisting of 50 per cent glycerin and 50 per cent physiological salt solution using one part of tissue virus to two parts of solution. Part 2 was emulsified with distilled water, one part tissue virus to two parts water. Part 3 was emulsified with physiological salt solution using one part tissue virus to two parts solution.

Each of the three parts was strained separately through 60-mesh bolting cloth. Part 3 was then further divided into three parts and designated as parts 3, 4 and 5. To part 4 was added 1 per cent of chloroform and to part 5, 1 per cent of 90 per cent phenol. The five parts of virus emulsion included 33⅓ per cent brain and cord tissue.

All of the parts were placed in cold storage maintained at 0° to 10° C. on March 25, 1931, and shaken daily. They were to be tested at the end of 100 days for infectivity or virulence.

Injection of Rabbits

July 3, 1931: The parts were removed from cold storage and each part diluted with physiological salt solution (one part of tissue virus emulsion to one part saline) to reduce the concentration of the preservative. Each part was then injected into two rabbits subdurally with 0.1 cc of the diluted emulsion. The results are shown in table I.

Table I—*Results of injections*

Part	Diluent	Rabbit	Result
1	50% salt solution and 50% glycerin	1 2	Survived 20 days Survived 20 days
2	Distilled water	1 2	Dead in 6 days. Rabies Dead in 6 days. Rabies
3	Salt solution	1 2	Dead in 7 days. Rabies Dead in 7 days. Rabies
4	Salt solution and 1% chloroform.	1 2	Survived 20 days Survived 20 days
5	Salt solution and 1% of 90% phenol	1 2	Survived 20 days Survived 20 days

Discussion and Conclusions

The rabies tissue virus in 50 per cent glycerin and salt solution; in salt solution with 1 per cent chloroform and in salt solution

with 1 per cent of 90 per cent phenol (all kept between 0° and 10° C.) lost its infectivity or virulence within 100 days. The same tissue virus, kept under the same conditions in salt solution alone and in distilled water, retained its infectivity or virulence. Glycerin, chloroform and phenol have a definite virucidal action, while salt solution and distilled water apparently in themselves have no effect on the virulence or infectivity of the virus under the conditions specified. This is of importance in the storage of rabies virus as such and also in the use of glycerin, chloroform and phenol as virucidal agents in the preparation of chemically killed rabies tissue vaccine. These agents destroyed the virulence or infectivity of the tissue virus within 100 days at comparatively low temperatures.

OSTEOGENIC CHONDROSARCOMA IN A CAT

By E. L. STUBBS, *Philadelphia, Pa.*

School of Veterinary Medicine, University of Pennsylvania

Subject: A black and white female cat that had been a household pet for thirteen years. One year previous to its death, it developed a lameness in the left hind leg. No soreness or enlargement could be found. Later a swelling developed in the left femoral region which enlarged slowly. The cat became anemic and was much emaciated. The tumor was hard and most marked on the posterior and inner sides of the femoral region (fig. 1).

Autopsy: Figure 2 shows the tumor mass involving all the femoral region. It was most marked on the posterior and inner sides and over the great trochanter. The anteroposterior thickness was about 4¾ inches, the width 2¾ inches and the length 4¾ inches. The tumor mass was more or less lobular in the region of the gracilis, semitendinosis and biceps femoris muscles. These muscles were almost entirely replaced by the tumor mass. A globular formation was found also in the region of the sartorious muscle, which was displaced by tumor tissue and the biceps femoris had a lobular enlargement over the great trochanter.

The tumor on cut section was gray and translucent and for a radius of 1 to 1½ inches around the shaft of the femur contained gritty material. Careful postmortem examination did not show any tumor in any other part of the animal.

Microscopic examination: The tumor is shown with its capsule. The tumor is quite cellular, with very little stroma. The cells

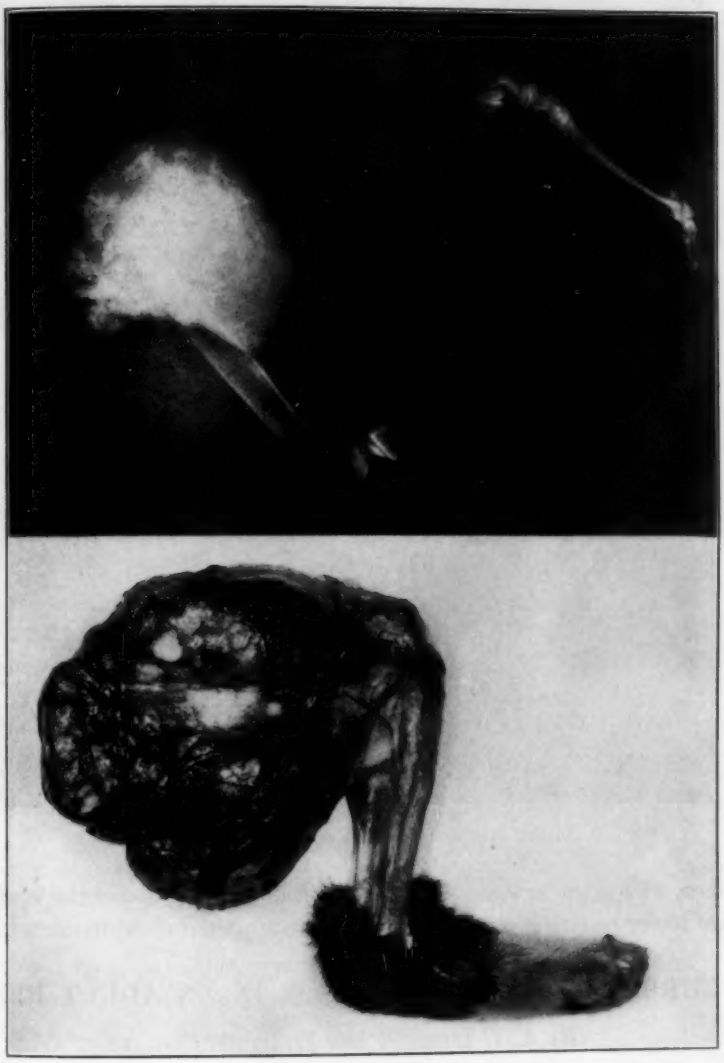


FIG. 1 (above). X-ray of osteogenic chondrosarcoma.
FIG. 2 (below). Dissection showing tumor mass.

are small, round and spindle, with some giant cells in certain areas (fig. 3). Some larger cells of cartilage type are found

but not surrounded by typical cartilaginous stroma, while others are like cartilage. The cells in some places are like osteogenic

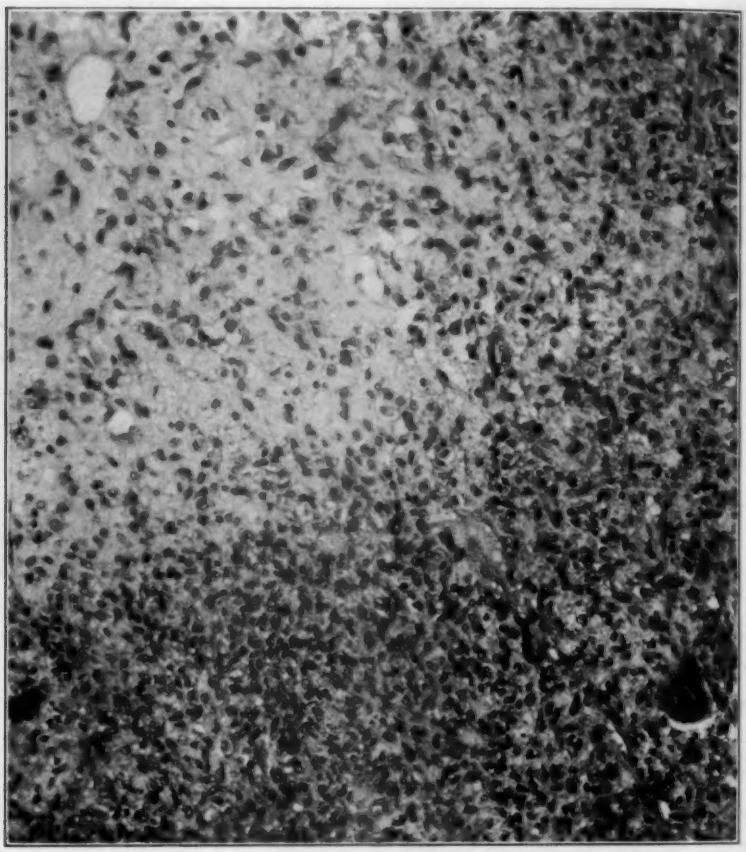


FIG. 3. Section of osteogenic chondrosarcoma. x 170

ones, with some spindle cells as seen in myxoma. Near the center are fewer cells. It appears to be an osteogenic chondrosarcoma.

CHRONIC PULLORUM DISEASE IN AN ADULT HEN

By A. J. DURANT *and* H. S. MCDOUGLE

Veterinary Department, University of Missouri, Columbia, Mo.

Subject: Adult two-year-old Barred Rock hen from a back-yard flock. The bird was brought in to the laboratory by the owner for diagnosis. It was alive, but listless and had a slight diarrhea.

Autopsy: The bird was killed and an autopsy held. Lesions were found in the ovaries, characteristic of pullorum disease, and the pericardial sac was greatly distended and filled with both

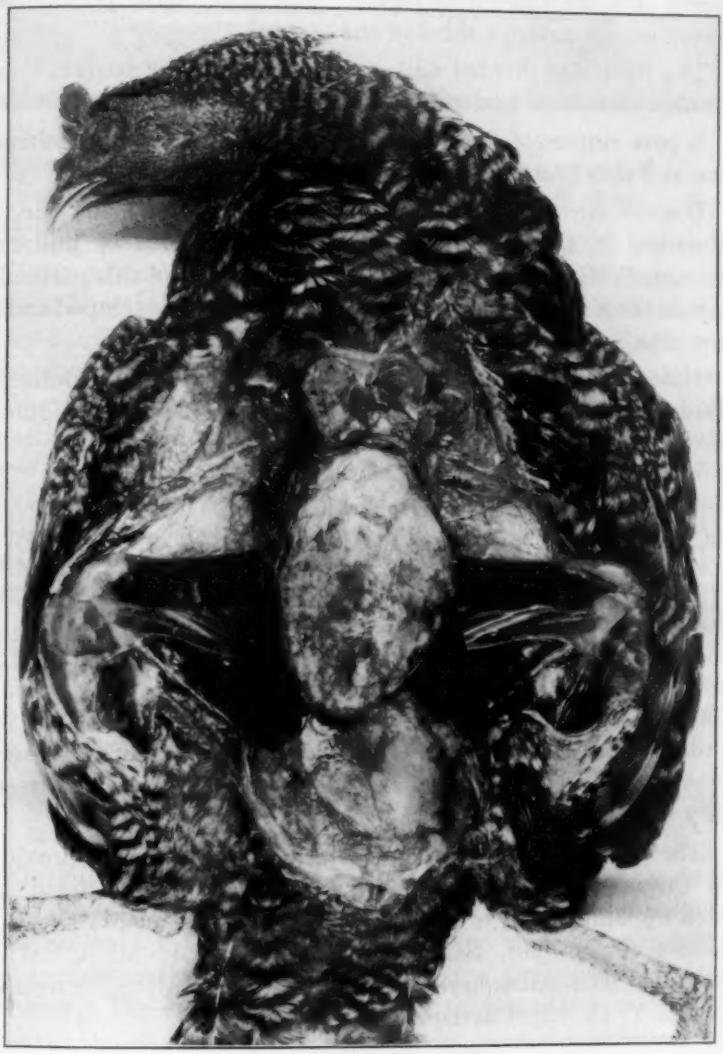


FIG. 1. Adult hen affected with chronic pullorum disease, showing great enlargement of the pericardial sac due to the disease.

solid and fluid pus. The mass of solid pus was seven times the normal size of the heart and weighed two ounces, and there was about an ounce of fluid in the cavity. The heart was approximately normal in size, but very soft and thin walled. The peri-

cardial sac was three and one-half inches long and two and one-half inches at its widest dimension. The enlarged organ entirely filled the thoracic cavity and extended back for a considerable degree into the abdominal region. The apex of the pericardium rested on the anterior third of the gizzard.

The liver was divided and pushed back to the posterior and lateral sides of the abdominal cavity.

A pure culture of *B. pullorum* was isolated from the misshapen ova and also from the fluid of the pericardial sac.

Discussion: Chronic pullorum disease of the heart sac, as described in this case, is a fairly common form of pullorum disease affecting adult fowls. A remarkable part of this particular case is the size to which the pericardial sac had developed and its contents.

Male birds appear to be more subject to this form of pullorum disease than females, though it occurs in both sexes. Figure 1 shows a photograph of the enlarged organ.

State Board Changes

Dr. A. F. Wempe (K. C. V. C. '15), of Marysville, Kans., has been appointed a member of the Kansas State Board of Veterinary Examiners, succeeding Dr. O. O. Wolf (Chi. '96), of Ottawa, who has been a member of the Kansas Board since its creation in 1909. Dr. P. B. Darlington (K. C. V. C. '15), of Chanute, was elected president of the Board at a recent meeting and Dr. E. F. Kubin (K. S. C. '09), of McPherson, was reëlected secretary. Dr. Kubin is now serving his seventh term as secretary of the Board.

The New Mexico Board of Veterinary Examiners, provided by the law which recently went into effect in that State, has been appointed and organized as follows: President, Dr. T. I. Means (Colo. '20), Santa Fe; secretary, Dr. M. C. Wiley (McGill '93), Albuquerque; member, Dr. Carl E. Freeman, (K. C. V. C. '09), Carrizozo.

England Controls Rabies

Helen Keller, the blind author, is reported to have passed up England, on her recent European tour, because a visit to that country would have meant a six-month quarantine for her pet dog. England believes in controlling rabies.

OBSERVATIONS ON THE BLOOD-SUCKING ACTIVITIES OF THE HOOKWORM ANCYLOSTOMA CANINUM. Herbert S. Wells. Jour. Parasitol., xvii (1931), 4, p. 167.

Observations of over 200 specimens of *Ancylostoma caninum* attached to the intestine of anesthetized dogs showed that under those conditions the worms are almost constantly sucking blood. The process of attachment of the worms to the mucosa, the details of the blood-sucking process, the passage of blood through the intestine of the worm, and its ejection through the anal orifice have been studied. A single worm is calculated to withdraw 8 cc of blood from the host during 24 hours. The ejected material appears to consist mainly of red corpuscles of the host together with some epithelial material and bacteria. From the rapidity of flow of blood through the worm it would appear that the parasite can utilize only simple, diffusible substances already prepared for its consumption by the host.

A GLIMPSE INTO THE LIFE HISTORY OF THE TAPEWORM OF SHEEP, MONIEZIA EXPANSA. D. F. Sinitsin. Jour. Parasitol, xvii (1931), 4, p. 223.

The author describes the structure and life history of the tapeworm of sheep, *Moniezia expansa*, over the period that intervenes between leaving the intestine of the sheep with the excrements and ending at the 45th day of their being at large and outside the host. The eggs are very resistant to desiccation and consequently the author believes that under normal conditions the eggs of *M. expansa* do not reach their prospective host at once but must remain at large two months. It appears that an intermediate host is lacking. The embryo, after a period of about two months of development in moist materials, returns again to sheep by the air.

THE CAUSE OF INACTIVATION OF THE ROUS SARCOMA FILTRATE DURING INCUBATION. Antoinette Pirie and Barbara Elizabeth Holmes. Brit. Jour. Exp. Path., xii (1931), 3, p. 127.

From a study of the effect of various inhibitors of oxidation and proteolysis on the activity of the Rous filtrate under different conditions, it is concluded that the inactivation of the filtrate which occurs at 37° C. is due to an oxidative change. It is shown that partial reactivation of the filtrate may occur in the presence of reducing agents and that sodium pyrophosphate and the hydrogen palladium reducing system preserve the activity of the filtrate for at least 24 hours.

A STUDY OF CROSS IMMUNITY WITH VIRUSES OF FOWL PLAGUE AND OBSERVATIONS ON THE DURATION OF IMMUNITY. Harvey Purchase. Brit. Jour. Exp. Path., xii (1931), 3, p. 199.

Using several strains of fowl-plague virus, no evidence of the occurrence of immunologically different types was found. It was found that fowls known to be able to resist inoculation with fowl-plague virus may, after a lapse of 32 days or more, succumb to fowl plague if then inoculated intramuscularly with the virus.

ERYTHROLEUKOSIS AND THE ANEMIAS OF THE FOWL. J. Furth, with assistance of Ruth Klingelhofer and Charles Breedis. Arch. Path., xii (1931), 1, p. 1.

Erythroleukosis of the fowl is a disease characterized mainly by (1) severe anemia with the appearance of lymphoid erythroblasts in the circulation, (2) splenomegaly and (3) the accumulation of cells resembling lymphocytes, presumably precursors of erythrocytes, in the capillaries of the organs, particularly of the bone marrow, liver and spleen. At the beginning of erythroleukosis, erythroblasts usually appear in the peripheral circulation while there is still an adequate supply of erythrocytes and hemoglobin. In contrast with secondary anemias, the number of polychrome erythrocytes in the circulating blood in proportion to the number of early erythroblasts is not considerable. Erythroleukosis has been produced by inoculation of blood, organ suspension, or Berkefeld filtrates of fowls, with myeloid leukosis or erythroleukosis. It occurs spontaneously, but its natural mode of transmission is unknown. The anemia induced by repeated bleedings or by the administration of pyrodine differs from the

erythroleukosis mainly by the relatively small number of early erythroblasts in the circulation and by the absence of leukostasis in the organs.

THE SUSCEPTIBILITY OF THE CHORIO-ALLANTOIC MEMBRANE OF CHICK EMBRYOS TO INFECTION WITH THE FOWL-POX VIRUS. Alice Miles Woodruff and Ernest W. Goodpasture. Amer. Jour. Path., vii (1931), 3, p. 209.

Ectodermal and entodermal cells of the chorio-allantoic membrane of the chick, as well as embryonic chick skin, are susceptible to infection with the virus of fowl-pox at an early stage in the development of the embryo. Whether or not this specific susceptibility is acquired as a result of cellular differentiation has not been determined. Four methods for the isolation of uncontaminated fowl-pox virus are described. In two of these methods the virus is developed in tissue that has never been contaminated by extraneous microörganisms. Fowl-pox infection in the trachea of the adult has been induced by means of inoculation with the uncontaminated virus.

MERTHIOLATE AS A PRESERVATIVE FOR BIOLOGICAL PRODUCTS. W. A. Jameson and H. M. Powell. Amer. Jour. Hyg., xiv (1931), 1, p. 218.

Merthiolate-preserved biological products are self-sterilizing and safe preparations. Merthiolate causes a minimum injury to labile antigen and antibody fractions, is practically non-injurious to bacteriophage and is most satisfactory as a preservative for serums and antitoxins. Bacterial cultures devitalized with merthiolate and culture filtrates prepared with merthiolate have high antigenic values.

THE EGG PRODUCTION OF TWO PHYSIOLOGICAL STRAINS OF THE DOG HOOKWORM, ANCYLOSTOMA CANINUM. O. R. McCoy. Amer. Jour. Hyg., xiv (1931), 1, p. 194.

The egg production of a cat strain of *Ancylostoma caninum* in cats was approximately 2,350 eggs per day per female, as compared with the normal production of 16,000 eggs per day per female by a dog strain of *Ancylostoma caninum* in dogs. The dog strain, when introduced into cats, produced an average of only 2,340 eggs per day, approximately the same number as did the cat strain. Infections of the dog strain in the cat, however, were

of shorter duration than those of the cat strain. When infections of the cat strain were established in dogs, the egg production averaged 11,600 eggs per day per female. Apparently egg production in controlled by the host and is not inherent in the strain of worms.

Calcification Following Massive Doses of Viosterol in Acute Experimental Bovine Tuberculsois of Guinea Pigs. Thomas Tipton Walker and Tom Douglas Spies. Amer. Rev. Tuber., xxiv (1931), 1, p. 65.

The administration of repeated massive doses of viosterol to guinea pigs with acute bovine tuberculosis causes extensive calcification within the caseous lesions. This calcification is much more marked than that which occurs in similar lesions of tuberculosis without the use of viosterol. Calcium is deposited also in apparently normal tissue of the heart, liver and kidneys of the tuberculous animals treated with viosterol.

The Accumulation of Iron in Tuberculous Areas. Valy Menkin and Miriam F. Menkin. Jour. Exp. Med., liii (1931), 6, p. 919.

Repeated daily intravenous injections of ferric chlorid solution were followed by an accumulation of iron in the tuberculous areas of the lungs. The iron accumulated in the caseous areas of tubercles and was demonstrable by the Prussian-blue reaction. Quantitative determinations corroborate these results and showed that the iron content of lung tissue in tuberculous animals injected with ferric chlorid exceeds that in normal animals injected with this salt, as well as that in non-injected tuberculous animals.

Tuberculotoxins and Their Significance in Allergy and Neutralization Phenomena. Frederick Eberson and Marion A. Sweeney. Jour. Immunol., xx (1931), 6, p. 395.

Intracutaneous and intraperitoneal studies were made with Berkefeld filtrates of cultures of tubercle bacillus in tuberculous and normal guinea pigs. Comparative studies included filtrates prepared from extracts of focal tuberculous lesions. In the intracutaneous experiments the reactions obtained with toxic filtrates were unlike those of tuberculin and confirm the authors' previous observations relating to the production of toxic substances by tubercle bacilli grown in suitable culture media. Combinations

of immune goat serum and toxic filtrated in varying proportions exhibited neutralizing properties of the serum under certain conditions. In normal non-tuberculous guinea pig controls those phenomena were not observed, indicating the specificity of these local reactions and that filtrates prepared from focal tuberculous tissues in the guinea pig were inactive. Intraperitoneal injections of toxic Berkefeld filtrates prepared from 5- to 18-day old cultures of tubercle bacilli caused typical immediate or delayed reactions that resulted in death or a chain of symptoms followed by recovery. Heating the filtrate to a temperature of 100° C. for one or two hours modified or prevented symptoms. These reactions did not occur in the normal guinea pig. Comparison of the behavior of filtrates with ordinary old tuberculin under identical conditions showed definitely marked qualitative and quantitative differences.

Chemical Changes in the Blood of the Dog in Experimental Bile Peritonitis. Allen M. Ziegler and Thomas G. Orr. Jour. Exp. Med., liii (1931), 6, p. 865.

After drainage of bile directly into the peritoneal cavity, dogs died in from one to five days. It is evident that dog bile is quite toxic. Apparently infection is not a contributing factor. In all animals that died bile ascites was found. Dogs dying of bile peritonitis showed a constant increase in the blood non-protein and urea nitrogen and a fall in the chlorids.

Keeping Quality of Milk and the Age on Testing for Total Bacterial Count. H. Barkworth. Jour. Hyg., xxxi (1931), 3, p. 373.

Examination of records for the period 1923-1929 show that on the average the afternoon milks showed nine hours less keeping quality than morning milks of the same bacterial count. The age of the milk on testing for total bacterial count (from time of milking) was 27-29 hours for morning milks and 20-24 hours for afternoon milks. The author carried on a series of investigations over a period of two years to determine the effect of the difference in time on the bacterial count. Very little change in counts took place. Data are presented to show that the average keeping quality at 24 hours old and at 28 hours old is practically the same. There is no indication that the nine-hour difference in keeping quality is connected with the four-hour difference in age on testing.

THE DEFORMABILITY AND THE WETTING PROPERTIES OF LEUCOCYTES AND ERYTHROCYTES. Stuart Mudd and Emily B. H. Mudd. Jour. Gen. Physiol., xiv (1931), 6, p. 733.

Under the conditions of the experiment the resistance to deformation of polymorphonuclear neutrophile leucocytes was shown to be, on the average, considerably less than the resistance to deformation of large mononuclear leucocytes. Other types of leucocytes seemed to fall between these two types in their average resistance to the interfacial tensions. The leucocyte of each type studied is surrounded by an exceedingly delicate membrane. A study of the wetting properties of leucocytes has shown that their external membranes are hydrophilic, a character suggesting a surface in which proteins, probably bound water and salts, possibly the polar radicles of soaps or fatty acids, are predominately exposed. The mammalian erythrocyte possesses a surface membrane capable of being folded and of withstanding tension in the interface. The surface of the erythrocyte as evidenced by its wetting properties is relatively hydrophobic and relatively non-polar in character as compared with the leucocyte.

Convention Notes

An octette of Wisconsin veterinarians registered from the Badger State: Drs. A. O. Bernhardt and R. S. Heer, Platteville; T. H. Ferguson, Lake Geneva; J. E. Griffin, James S. Healy, E. C. McCulloch and W. Wisnicky, Madison; and C. M. Heth, La Crosse.

Louisiana veterinarians took advantage of the proximity of the convention. Nine were at the meeting, including Drs. G. A. Bryson, Shreveport; H. A. Burton, Alexandria; K. W. Franks, Minden; W. J. Gray, Thibodaux; A. D. Kendrick, Homer; Louis Leonpacher, LaFayette; Hamlet Moore, New Orleans; Harry Morris, Baton Rouge; and M. L. Walter, Napoleonville.

Ten veterinarians from South Dakota made the trek to Kansas City. The number included Drs. B. H. Cooper, Flandreau; E. L. Eggleston, Alcester; A. H. Hill, Rapid City; P. E. Johnson, Britton; J. D. Quelland, R. S. Robinson and J. O. Wilson, Pierre; C. F. Rathbun, Watertown; M. W. Ray, Sioux Falls; G. S. Weaver, Brookings.

Regular Army

Colonel Andrew E. Donovan is assigned to duty at Fort Jay, N. Y., effective upon completion of his present tour of foreign service, and will join that station and report for duty as station veterinarian, and in addition is assigned to duty as attending veterinarian at Fort Slocum, N. Y., Fort Wood, N. Y., the harbor defenses of eastern and southern New York and Sandy Hook, N. J., and headquarters Second Corps Area.

Major Everett C. Conant is relieved from further assignment and duty as transport veterinarian, U. S. A. T. "Meigs," Fort Mason, Calif., effective on or about December 1, 1931, and assigned to Presidio of Monterey, Calif., for duty.

First Lieutenant Maurice W. Hale is relieved from duty at Fort Sam Houston, Texas, effective or or about November 15, 1931, will then proceed to Fort Mason, Calif., and report to the superintendent Army Transport Service for duty as transport veterinarian.

Major Fred C. Waters is relieved from duty at Presidio of Monterey, Calif., will proceed to Seattle, Wash., and report to the commanding officer Seattle quartermaster depot for duty.

The promotion of the following-named officers to the grades indicated is announced:

To the grade of Lieutenant Colonel:

Major Geo. H. Koon
Major Daniel B. Leininger

To the grade of Major:

Captain John K. McConeghy
Captain Francois H. K. Reynolds
Captain Sawyer A. Grover
Captain Charles S. Williams
Captain Fred W. Shinn
Captain Philip H. Riedel
Captain Irby R. Pollard
Captain Frank C. Hershberger
Captain Clifford E. Pickering
Captain Frank B. Steinkolk
Captain Raymond Randall
Captain Seth C. Dildine
Captain Joseph H. Dornblaser
Captain George L. Caldwell
Captain Jacob L. Hartman
Captain John H. Kintner
Captain Arthur D. Martin
Captain Samuel G. Kielsmeier
Captain Peter T. Carpenter
Captain Oness H. Dixon, Jr.
Captain John W. Miner

Veterinary Reserve Corps

New acceptances

Kester, Wayne Otho	2nd Lt.	Cambridge, Nebr.
Yule, Richard George	2nd Lt.	812 W. Oak St., Ft. Collins, Colo.
Eichhorn, Herbert Jacob	2nd Lt.	112 W. Walnut St., Cardington, Ohio
Lucey, Leander Irving	Capt.	Box 1696, Wichita Falls, Tex.

Promotions

	To	
Jones, Jacob James	Major	La Plata, Md.
Wallman, Israel	Major	6124 Rhodes Ave., Chicago, Ill.
Hill, Anson Harris	Capt.	Rapid City, S. Dak.
Horning, Jackson Gilbert	Capt.	Box 363, Houston, Texas
Beck, John Dengler	1st Lt.	39th St. & Woodland Ave., Phila., Pa.
Conway, James Clifford	1st Lt.	Box 66, New Goshen, Ind.
Elliott, Charles Herbert	1st Lt.	Yorkville, Ill.

MISCELLANEOUS

Doctor Wilson Holds High Office

When instances of veterinarians being selected for positions somewhat out of the ordinary run are brought to our attention, it is always a pleasure to comment on such things in these pages. As an illustration of what we have in mind, we are pleased to announce the election of Dr. Irl Donaker Wilson (Iowa '14), of Blacksburg, Virginia, to the presidency of the Virginia Academy of Sciences, an organization of about 700 members, including

DR. I. D. WILSON

physicians, chemists, biologists, physicists, astronomers, mathematicians, and others connected with allied sciences.

Dr. Wilson is Animal Pathologist and head of the Department of Zoölogy and Animal Pathology of the Virginia Polytechnic Institute, and secretary of the Virginia State Veterinary Medical Association. Believing that if there is a job to be done, it is well to select a busy man to do it, President Dykstra has just appointed Dr. Wilson A. V. M. A. resident secretary for Virginia.

Publicity for Practicing Veterinarians

The well-known firm of Chappel Brothers, of Rockford, Illinois, is about to inaugurate a new policy which will undoubtedly result in a much greater use of veterinary services by dog-owners. Several thousand veterinarians are already familiar with the proposed plan, as outlined in a letter written by Mr. P. M. Chappel, president of the firm, several months ago.

Briefly the policy to be put into operation by Chappel Brothers is to imprint the following legend on the labels of all containers of Ken-L-Ration:

> WHENEVER YOUR DOG IS SICK, REMEMBER A LICENSED GRADUATE VETERINARIAN IS THE ONE BEST QUALIFIED TO DIAGNOSE THE ILLNESS AND PRESCRIBE. CONSULT YOUR VETERINARIAN.

The letter above referred to asked veterinarians to express their opinions on the proposal of Chappel Brothers. Of those veterinarians who took the trouble to answer Mr. Chappel's letter, fully 83.6 per cent approved the proposition as presented. Another 15 per cent favored the idea but suggested changes in the wording of the proposed legend, which in its original form conveyed the impression that veterinarians make no charge for consultations. Only 1.4 per cent of the veterinarians who expressed themselves disapproved of the idea. Practically all of these expressed the fear that this particular form of advertising the profession would be unethical.

In announcing the decision of his firm to imprint the legend on all Ken-L-Ration labels, Mr. Chappel said:

> Unlike other dog-food manufacturers, we have never put out a line of medicines, nor attempted to diagnose and prescribe by mail. We have always tried to discourage correspondence from owners of ailing dogs, because we felt that the local licensed graduate veterinarian is the only person qualified and in a position, through examination, to gauge the true condition of a dog's health. In every such instance, therefore, we have made it a practice to write back and suggest that they consult their local veterinarian. The imprinting of the veterinary legend on our Ken-L-Ration labels is simply in keeping with our policy of coöperating with veterinarians and of fighting the indiscriminate medication of his animal by the dog-owner himself with patent and "mail order" remedies.

Very well put, Mr. Chappel. All parties should profit from the arrangement: the dog, his owner, the veterinarian and Chappel Brothers.

Swine erysipelas has been reported from Logan and Hardin counties, Ohio.

The California Veterinary Practice Act has been amended, raising the annual license fee to five dollars.

Doctor Seifried Honored

Dr. Oskar Seifried, who has been at the Rockefeller Institute for Medical Research, at Princeton, New Jersey, as an associate member for several years, has received a call to succeed Professor Kitt as Professor of General Pathology and Pathological Anatomy and Director of the Pathological Anatomy and Director of the Pathological Institute of the Veterinary faculty of the University of Munich, April 1, 1932.

K. C. V. C. Dinner

The K. C. V. C. dinner in connection with the Kansas City convention of the A. V. M. A., was held in the Pompeiian Room of the Baltimore Hotel, at 6 p. m., August 25, 1931.

There were present 185 alumni and 135 guests, mostly ladies. Among those present were Dr. W. M. Bell, '92, Nashville, Tenn., the first student and first graduate of K. C. V. C., and Dr. H. C. Simpson, '99, of Pomona, Calif., the first graduate of the three-year course. Every class from 1892 to 1918, inclusive, was represented, excepting 1893, 1894, 1896 and 1898.

Twenty-four states, the District of Columbia and the Virgin Islands were represented. The largest delegation (64) represented Missouri. Kansas had 32 and Nebraska 23. Texas and Iowa each had 12; Oklahoma, 9; South Dakota, 4; Illinois and Minnesota, 3; Indiana, Tennessee, North Carolina, Louisiana, Utah and California had 2 each. There was one representative from the Virgin Islands, South Carolina, Georgia, District of Columbia, Maryland, Pennsylvania, Ohio, Michigan, Arkansas, Colorado and New Mexico.

There was a brief business session and the remainder of the time was spent renewing acquaintances and having a good time.

A. T. K.

Borrowed for the Occasion

Delegates to the fifty-fifth annual meeting of the American Humane Association, held at Grand Rapids, Mich., October 19-22, 1931, upon entering the spacious lobby of the Hotel Pantlind, official headquarters, were greeted by a dappled gray specimen of *Equus caballus* standing in the middle of a patch of green grass. Examination disclosed that Dobbin was made of *papier mâché*, and inquiry revealed that he had been loaned by a local second-hand store and that the grass came from a nearly funeral parlor.

AMERICAN VETERINARY MEDICAL ASSOCIATION

Proceedings of the Sixty-eighth Annual Meeting, Kansas City, Missouri, August 25 to 28, 1931

(*Continued from page 552, October issue.*)

Section on General Practice

WEDNESDAY MORNING, August 26, 1931

The first session of the Section on General Practice was called to order at 9:25 a. m., by Dr. J. H. Spence, Chairman. (Dr. S. L. Stewart, Secretary.)

CHAIRMAN SPENCE: Gentlemen: As you know, the purpose of this meeting is to consider the different phases of general practice. Secretary Stewart will now address you.

SECRETARY STEWART: The first thing on the program this morning will be a short address by our Chairman, and then we will go directly to the subject matter of the program.

CHAIRMAN SPENCE: Gentlemen, as your chairman, I am supposed to make an address. To me it is a problem to know what is expected and about which to speak.

At this time, we are passing through a trying time for the general practitioner. Things are bad, and the veterinarian has to be a real financier to keep his head above the general depression. But, as bad as it is at present, conditions do not appear to me nearly so bad as in the years of 1894, 1895 and 1896, when, for over two years, I never had a call in the country and simply existed on what I got to do in the small city in which I am still located. So we should keep our heads up, for as bad as things are, they could be worse.

I am now going to deviate from the usual course of an address and make a few remarks on the ever-present trouble called hemorrhagic septicemia. This is a disease with which most veterinarians in country practice are thoroughly familiar. I do not propose to give you a conventional treatment of the subject. Neither do I propose to give you much of my own experience or case reports.

The Eastern Iowa Veterinary Association and our State Association sponsor organizations of practitioners by county units. It has been my privilege to attend many such meetings where all is informal and good fellowship prevails and most every practitioner has a word to say before his fellows.

A subject very commonly discussed at such meetings is hemorrhagic septicemia of swine, cattle, sheep, fowls, rabbits and horses. In the freedom of good fellowship, many startling facts have been there brought forth as to forms, symptoms and treatments of this very prevalent plague. The experience detailed most graphically, by so many practitioners, of the negative phase in their use of hemorrhagic septicemia aggressin in infected herds and the short-time immunity apparently conferred accounts for the change so generally in my section back to the less dangerous and apparently equally efficacious bacterin.

At many of the meetings, the importance of sanitation in treating with biological products has been emphasized, especially regarding the purity of the water supply for the infected herd or drove. It has long been the custom for the younger generation of practitioners to smile at our addition of the good old standby, sodium hyposulphite, to the drinking water, in treating such infectious diseases. Cleaning the stock tank and adding sodium hyposulphite or air-slaked lime is excellent practice and has proven a valuable supplemental treatment for cattle which will not drink water with other medication as will swine.

In my own experience and that of many others, I believe that hemorrhagic septicemia is a very prevalent disease in most localities where feeding cattle, swine and sheep have been shipped in, and yet practitioners dealing with the disease almost daily, in the fairest weather and foul, are very often led astray by atypical symptoms and so err in their diagnoses.

We have practitioners who are conscientiously and efficiently making so many diagnoses of hemorrhagic septicemia on the farms of their clients that certain elements in the population ridicule them and nickname them "Old Hemorrhagic Septicemia."

Rendering-plant men have been known to make the diagnosis of hemorrhagic septicemia. Some veterinary practitioners state that drivers of rendering-plant trucks hazard their guess to the owner that the animal which has suddenly or mysteriously died must have had hemorrhagic septicemia. Asked by the owner what is usually the procedure, the hauler recommends calling the veterinarian for vaccination. Neighbors and live stock growers who have heeded the call to "be your own veterinarian" often make the diagnosis of hemorrhagic septicemia and as often attempt treatment with biologicals.

Economic trends and misinformation spread by various agencies (for political, mercenary, or publicity reasons) have

brought a serious situation to confront the live stock industry and veterinary profession. Let me recite a hypothetical case:

You have a client who thoroughly believes in you and has shown his real appreciation of your services through the years. A good client and your champion. All of us have such. Not the riff-raff kind which falls for the stock-food peddler, the would-be veterinarian, the one who believes most in the superiority of the far-off veterinarian in public pay.

One day you are called to the aid of this good client. You make a diagnosis of "hemorrhagic septicemia." Trips, owing to distance, make your fee for diagnosis and treatment ten dollars, which is paid with satisfaction.

A few days later, your good client is approached by a meddling brother or neighbor, who asks: "How much did Doc charge you for vaccinating your ten head of cattle for hemorrhagic?" "Ten dollars." "Gosh, here's a price list I just received from the serum company. Hemorrhagic septicemia bacterin, ten cents per dose. Hemorrhagic septicemia aggressin, ten cents per dose. Doc can surely buy that stuff as cheaply as you and I. He made at least 90 cents per head profit. Nine hundred per cent. Pretty stiff, these days, isn't it?"

Your client never looked at your service in that light heretofore. Maybe he says: "That's too doggone much. In these days when I have to scratch so hard to get the money together to pay Doc, he has no business charging such a long profit."

When our good clients get to wondering, we are in a bad way. What can we do about it excepting to be less open-handed and frank in naming the particular bug which we suspect and merely calling the condition "an infection." More isn't required of the physician. Many practitioners are cured of making such specific diagnoses. Some too late. When one gets paid for such a diagnosis and a neighbor is called to do the vaccinating, that's quite a blow. A worse blow when one doesn't get paid even for the diagnosis, I understand.

Much contradictory information from our experimental laboratories notwithstanding, I believe the many practitioners who assert having made diagnoses of hemorrhagic septicemia in swine, or swine plague, were right. I do decry the fact that veterinary practitioners have made such diagnoses erroneously and forgot hog cholera until grave and costly inroads suggested the use of anti-hog cholera serum and virus.

As for horses, I believe all of us may have overlooked cases of unadulterated hemorrhagic septicemia in our diagnoses of sporadic ailments among horses. Hemorrhagic septicemia can be readily, safely and cheaply eliminated by a dose of bacterin, as is practiced as a regular routine by so many veterinarians in treating even milk fever in cattle.

Sheep very sick with hemorrhagic septicemia often make a surprising and miraculous response to treatment with biologicals. Failures of the bacterin treatment are, in my opinion, mostly due to complicating organisms not included in the bacterin.

The gist of all this is: Think about, consider, eliminate hemorrhagic septicemia. Never make the specific diagnosis of hemorrhagic septicemia. Refer to it in dealing with your client as "an infection." In treating the disease in any species, including fowls, supplement your biologicals with sanitation. Assure yourself of pure water supply and medicate even that.

I do not believe a lasting immunity can be established by a course of this disease even though we know anti-hemorrhagic septicemia serums are made by stepping up the immunity by hyperimmunizing animals. It follows that I do not believe we can successfully confer a lasting artificial immunity by the use of biologicals.

Gentlemen, I thank you.

* * * *

The following program was presented:

"Bang's Disease (Contagious Abortion) in Cattle, Including Treatment and Control and Its Relation to Undulant Fever in Man," Dr. Charles H. Kitselman.

"Spontaneous Infection with *Brucella Abortus* in the Bull," Drs. F. B. Hadley and E. B. Osborn. (Read by Dr. E. C. McCulloch.)

"Clinical Studies on Retained Placenta in the Cow" (Illustrated), Dr. C. C. Palmer.

"Deficiency Problems in Cattle," Dr. A. F. Schalk. (Read by title.)

"The Value of Iodin in Cattle Practice," Dr. E. C. McCulloch.

. . . The session adjourned at 12:25 p. m. . . .

RECESS

THURSDAY MORNING, August 27, 1931

The second session was called to order at 9:15 a. m., by Chairman Spence.

The following program was presented:

"Post-Vaccination Problems in Swine," Dr. Henry Hell.

"Sheep Diseases: Field and Experimental Studies," Dr. Henry W. Turner. (Read by title.)

"Care of the Ewe Before and After the Lambing Period," Dr. L. A. Hammers.

"County-Wide Eradication of Equine Parasites," Dr. John B. Bryant.

* * * *

CHAIRMAN SPENCE: I want to thank the contributors of all the papers that were presented to this Section for giving us their time. It required quite a lot of time to prepare the excellent papers which we have heard. I also wish to thank those who had the patience to listen to us. They gave strict attention and all were on their good behavior.

. . . The session adjourned at 12:05 p. m. . . .

ADJOURNMENT

Section on Sanitary Science and Food Hygiene

WEDNESDAY MORNING, August 26, 1931

The first session of the Section on Sanitary Science and Food Hygiene was called to order by Dr. W. F. Crewe, of Bismark, N. Dak., acting as Chairman pro tem, in the absence of Dr. W. J. Butler, of Helena, Mont. (Dr. W. H. Lytle, Secretary.)

CHAIRMAN CREWE: Until a few days before I left, Dr. Butler intended to come and we were to make the trip together. He wired me, at the last minute, that the Governor had asked him to stay and help in taking care of the live stock suffering on account of the drought. A very unfortunate condition exists in Montana and it means that the large animals must be moved out of the drought area and provisions made for caring for a number of breeding animals which must be carried over as foundation stock.

* * * *

The following program was presented:

"Hog-Lot Sanitation and Its Relation to Swine Disease Control," Dr. H. A. Wilson.

"Tick Eradication," Dr. Joe H. Bux.

"Anthrax," Dr. N. F. Williams.

. . . Chairman Crewe called for the next paper listed on the program, but owing to the lateness of the hour, a motion was

made and carried to postpone the two remaining papers scheduled for this Section until Thursday morning. . . .

. . . The session adjourned at 12:45 p. m. . . .

RECESS

THURSDAY MORNING, August 27, 1931

The second session was called to order at 9 a. m., by Dr. W. F. Crewe, acting chairman.

CHAIRMAN CREWE: As those of you who were here yesterday know, we were unable to finish the program scheduled for the session yesterday, so this morning we will start with the two papers left over from that program.

The following program was presented:

"Problems of Tuberculosis Control and Its Relation to Sanitary Science and Food Hygiene," Dr. Peter Malcolm.

"Diseases of Young Lambs," Dr. Hadleigh Marsh.

"An Epizoölogical Study of Shipping Fever in Kansas," Dr. Herman Farley.

"Experiences in Eradicating Bang's Disease in Three Infected Herds of Cattle," Dr. C. F. Clark.

"The Control of Bang's Disease in Range Animals," Dr. A. M. McCapes.

. . . The session adjourned at 12:20 p. m. . . .

ADJOURNMENT

Section on Research

WEDNESDAY MORNING, August 26, 1931

The first session of the Section on Research was called to order at 9 a. m., by Dr. E. T. Hallman, Chairman. (Dr. W. A. Hagan, Secretary.)

The following program was presented:

"Some Bipolar Organisms Found in Pneumonia in Sheep," Drs. I. E. Newsom and Floyd Cross. (Read by Dr. Cross.)

"Report of Further Work on the Relation of "*Bacterium Abortus* Bang to Fistula and Poll-Evil of Horses" (Illustrated), Dr. C. P. Fitch, Lucille Bishop and Dr. W. L. Boyd. (Read by Dr. Fitch.)

"Blackleg Immunization," Dr. Joseph P. Scott.

"Studies on Canine Distemper: I. The Bacteriology of One Hundred Naturally Infected Cases," Dr. A. S. Schlingman.

"Histological Studies on Hog Cholera" (Illustrated), Drs. C. B. Cain and O. Seifried. (Read by Dr. Cain.)

"A Study of Hog Cholera Serum and Virus for the Presence of Brucella," Drs. I. Forest Huddleson and H. W. Johnson. (Read by Dr. A. S. Schlingman.)

"Salmon Poisoning: Transmission and Immunization Experiments," Drs. B. T. Simms, A. M. McCapes and O. H. Muth. (Read by Dr. Simms.)

"Preliminary Bacteriological Report on Shipping Fever," Drs. Joseph P. Scott and Herman Farley. (Read by Dr. Scott.)

"The Resistance of the Bacillus of Johne's Disease to Lytic Influences" (Illustrated), Dr. W. A. Hagan and Eveoleen Rexford. (Presented in abstract by Dr. Hagan.)

* * * *

CHAIRMAN HALLMAN: I want to thank the contributors to this program for their interest in helping to make it possible to complete the program. It is only through your splendid coöperation that we have been able to cover the ground.

. . . The session adjourned at 12 noon. . . .

RECESS

Section on Poultry

WEDNESDAY MORNING, August 26, 1931

The first session of the Section on Poultry was called to order at 9 a. m., by Dr. E. L. Brunett, Chairman. (Dr. Frank Thorp, Jr., Secretary.)

The following program was presented:

"Hatchability of Eggs and the Livability of Chicks of Pullorum-Infected and Non-Infected Hens," Dr. H. C. H. Kernkamp.

"Studies on Tuberculosis of Turkeys" (Illustrated), Drs. W. R. Hinshaw, K. W. Niemann and W. H. Busic. (Read by Dr. Hinshaw.)

"Observations on Prolapse ('Blow Outs') in Chickens," Dr. H. J. Stafseth.

"Recent Developments in Fowl Helminthiasis" (Illustrated), Dr. James E. Ackert.

"Studies of Leukemia of Fowls" (Illustrated), Dr. R. Fenstermacher.

"Pasty Eyes in Ducklings," Dr. H. J. Stafseth.

"The Control of Poultry Diseases by the Utah Improvement Association," Dr. Hugh Hurst.

. . . The session adjourned at 12 noon. . . .

RECESS

Section on Research and Section on Poultry Joint Session

THURSDAY MORNING, August 27, 1931

The second session of the Section on Research and the second session of the Section on Poultry were convened as a joint session of the two sections, at 9 a. m., Dr. E. T. Hallman presiding.

The following program was presented:

"The Relation of the Time Element to the Results Obtained by the Rapid Agglutination Test for Bang's Disease" (Illustrated), Drs. C. R. Donham and C. P. Fitch. (Read by Dr. Donham.)

"Comparative Germicidal Tests of Mercurochrome and Tincture of Iodin," Major R. A. Kelser and Lt. R. W. Mohri. (Read by Major Kelser.)

"A Modification of the Rapid Agglutination Test for Pullorum Disease," Dr. Howard Welch. (Read by Dr. Hadleigh Marsh.)

"Studies of Some Virus Diseases of Fowls," Drs. C. A. Brandly and L. D. Bushnell. (Read by Dr. Brandly.)

"A Comparison of Three Methods of Testing for Pullorum Disease, with Finer Interpretations of Readings on the Old Tube Agglutination Test," Dr. A. J. Durant.

"An Ataxia of Chicks Associated with Nephritis," Dr. Glen L. Dunlap.

. . . The session adjourned at 12 noon. . . .

ADJOURNMENT

Section on Small Animals

WEDNESDAY MORNING, August 26, 1931

The first session of the Section on Small Animals was called to order at 9:30 a. m., by Dr. F. F. Parker, Chairman. (Dr. C. F. Schlotthauer, Secretary.)

CHAIRMAN PARKER: The first on this program is the Chairman's address. It will be very short in order that we have the more time for our fine program.

This is the seventh official meeting of the Section on Small Animals of the A. V. M. A. Greater and more enthusiastic interest is taken in this Section each year and many veterinarians in general practice attend these sessions on account of an ever-increasing demand for their services to small animals. This Section is as much yours as anybody's and please feel free to enter into the discussions at any time.

As more and more is expected of us each year, we have to strive the harder to meet the demand. A veterinarian today may be asked to set a canary bird's leg in the morning and treat a thousand-pound bear in the afternoon for stomachache.

There are a few things most necessary to render the highest service in small-animal practice. First of all, we should be natural-born humanitarians; love the people as well as the pets. We should not only be kind and tender with the pets we care for, but in case of severe illness or injury, be sympathetic and understanding with the owner thereof—a service never to be forgotten.

We should be able to occupy a place in the family alongside that of the family physician. Along this same line of thought and considering that we have at our command many and varied forms of both local and general anesthesia, we should never be guilty of causing any unnecessary pain in caring for our patients.

Our honorable President, in his most excellent address to us yesterday, made known his attitude toward advertising, which was to the effect that our work should be the standard of public opinion. We may not build a practice so fast, but it will be the more desirable. In other words, let us uphold the dignity to which our fine profession is entitled, and not be classed as "advertising doctors."

Our Secretary, Dr. Schlotthauer, has prepared what appears to be a very fine program for you and the Chair wishes you to discuss the subjects freely. I assure you that I will serve you to the best of my ability. I thank you.

Doctor Schlotthauer will present the Secretary's report.

SECRETARY SCHLOTTHAUER: You men engaged in small-animal practice now hold an enviable position. In comparatively few years you have developed your branch of veterinary medicine until today it is one of major importance. Many of you can well remember the veterinary hospital and office of twenty-five years ago. It too often was merely a place to house the veterinarian, and his equipment was anything but a place to be viewed with pride. Your interest in small animals and public wants has brought about a marked change. Your hospitals and offices have set a high standard for the profession. We are all happy and proud for this change. You and your establishments are looked upon with public favor in every city and town. Your excellent service has won public confidence. You can indeed be proud of these attainments.

We have a full program for this Section. The subjects presented should be interesting to all and good discussions should follow. We are all practicing scientific medicine. It holds no secrets. Mysticism and secrecy are the tools of the quack and cultist. Therefore, please permit your thoughts to bear expression.

* * * *

The following program was presented:

"Non-Parasitic Skin Diseases of Dogs," Dr. E. C. Khuen.

"Treatment of Diseases of the Eye and Accessory Organs," Dr. D. A. Eastman.

"The Treatment of Fractures," Dr. E. B. Dibbell.

"Meningo-Cerebral Complications in Canine Distemper," Drs. Ashe Lockhart and S. R. Johnson. (Read by Dr. Lockhart.)

. . . Dr. E. J. Frick made some announcements concerning the clinic. . . .

. . . The session adjourned at 12:25 p. m. . . .

RECESS

THURSDAY MORNING, August 27, 1931

The second session was called to order at 9 a. m., by Chairman Parker. The following program was presented:

"A Consideration of the Diet of Dogs," Dr. C. F. Schlotthauer.

"Parasites of Ranch Foxes and Their Treatment," Dr. Karl B. Hanson.

"Anesthetics for Small Animals—Their Indications and Uses" (Illustrated), Dr. E. R. Frank.

. . . . The session adjourned at 11:55 a. m. . . .

ADJOURNMENT.

Convention Notes

Through an error, it was stated in a note in the September JOURNAL that New Mexico was not represented at the convention. Dr. H. E. Kemper, of Albuquerque, was in attendance. This leaves Arizona and Nevada as the only states west of the Mississippi not represented at Kansas City.

In addition to the Washington, D. C., veterinarians named in the September JOURNAL, the following were at Kansas City: Drs. G. Dikmans and E. M. Nighbert, of the Zoölogical Division, B. A. I.; and Major R. A. Kelser, of the Army Veterinary Corps. Dr. H. E. Hasseltine represented the National Institute of Health at the convention.

Report of the Committee on Education

MR. PRESIDENT AND MEMBERS:

INTRODUCTION

The data presented in this report have been obtained (1) from replies to questionnaires sent to the deans of the veterinary schools; (2) from a study of the catalogs of the schools; (3) from information gained from visits to all of the schools in the United States and Canada; (4) from a study of the official registers of veterinarians of the various states; (5) from replies to questionnaires sent to about 2000 practitioners, with returns from about 1000; (6) from statements from state and government authorities in charge of veterinarians in state or government positions; and (7) from a survey made by the National Association of Bureau of Animal Industry Veterinarians.

The Committee wishes, in the outset, to thank all those who have coöperated in furnishing this material. A number of state registers were made or revised especially for the Committee and a fine response was had from individuals in answer to quite personal questions.

Part I. Student Body

ENROLLMENT

Chart 1 shows the graphic record of enrollment for each school for the period 1920-29. Chart 2 shows the enrollments of three schools (Pennsylvania, Iowa and New York) for a twenty-year period. The decade started with a downward swing, which had its beginning in 1915 and did not reach the low point until 1923-25. Not only was the enrollment decreasing in the schools which have continued to operate, but during the same period twelve schools closed their doors.

It was not until 1927 that the enrollment returned to the same level which marked the close of the last decade. The registration in 1930-31 reached the figure 1222 (12 schools), an increase of 133 as compared with increases of 168 and 175 the two preceding years. It will be shown later than 1400 to 1500 students will be necessary to maintain the present number of veterinarians in the field. The number of students in colleges at the present time is not alarmingly low; the distribution might be better. Five schools have too few and at least one has too many for the present staff and equipment. Chart 3 is a graphic representation of the attendance at the various schools for the school year 1930-31.

ORIGIN OF STUDENTS

Table I gives the origin of freshmen from 1925 to 1929 and the schools of their choice. Table II and chart 4 show that the students come very largely (70 per cent) from the states in which the schools are located. Twenty-two states have furnished less than five students each in the last five years. Of the freshmen 2.6 per cent are from foreign countries. The remaining 37 states supply 22.8 per cent and these same states have 58.8 per cent of the veterinarians of the country. (The remaining 4.6 per cent go from one school state to another.) The supply of veterinarians from the entire country must come from the eleven schools of the country (except for the small number coming from Canada and European countries), and yet 70 per cent of them originate in the school states. The other 37 states are doing almost nothing to support veterinary education and are supplying very few students, although they have nearly 60 per cent of the veterinary population of the country. Something should be done to awaken interest in the veterinary profession in states which have no schools. State scholarships should be provided in such states for those who wish to study veterinary medicine in one of the other states having schools.

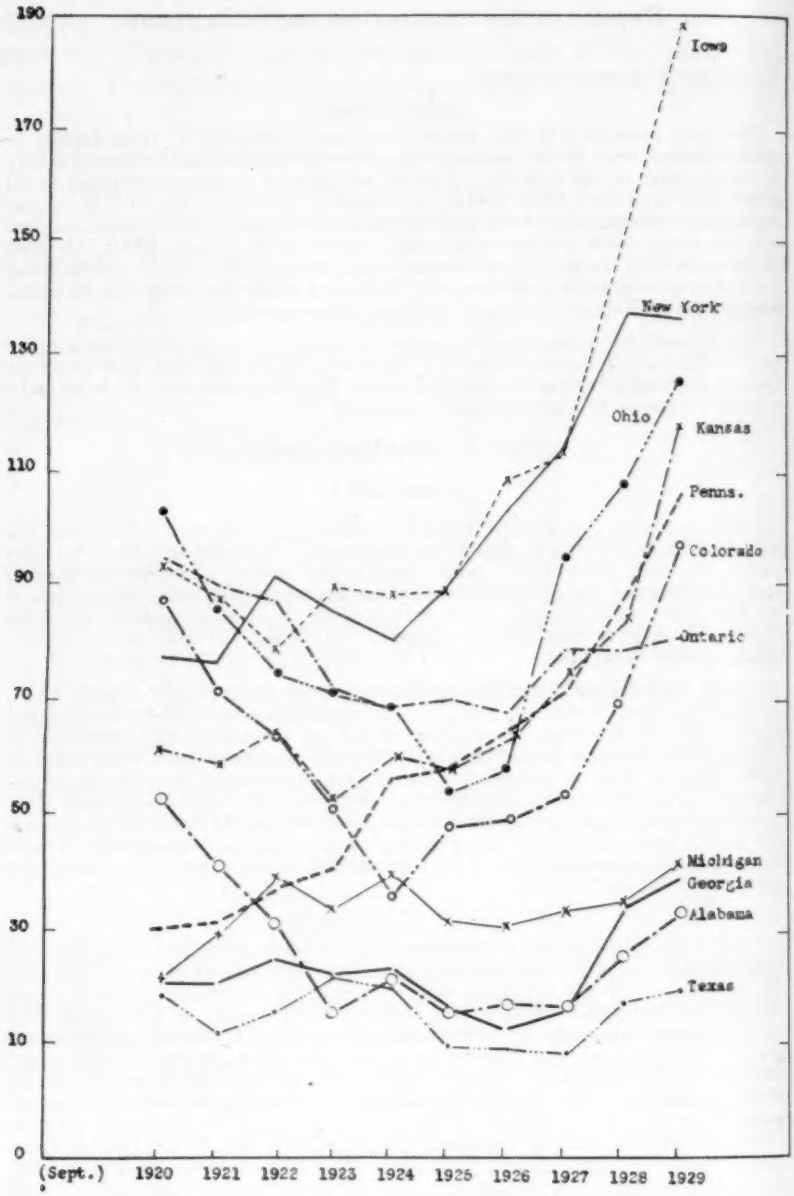


CHART 1. Student enrollment in eleven veterinary colleges, 1920-1929.

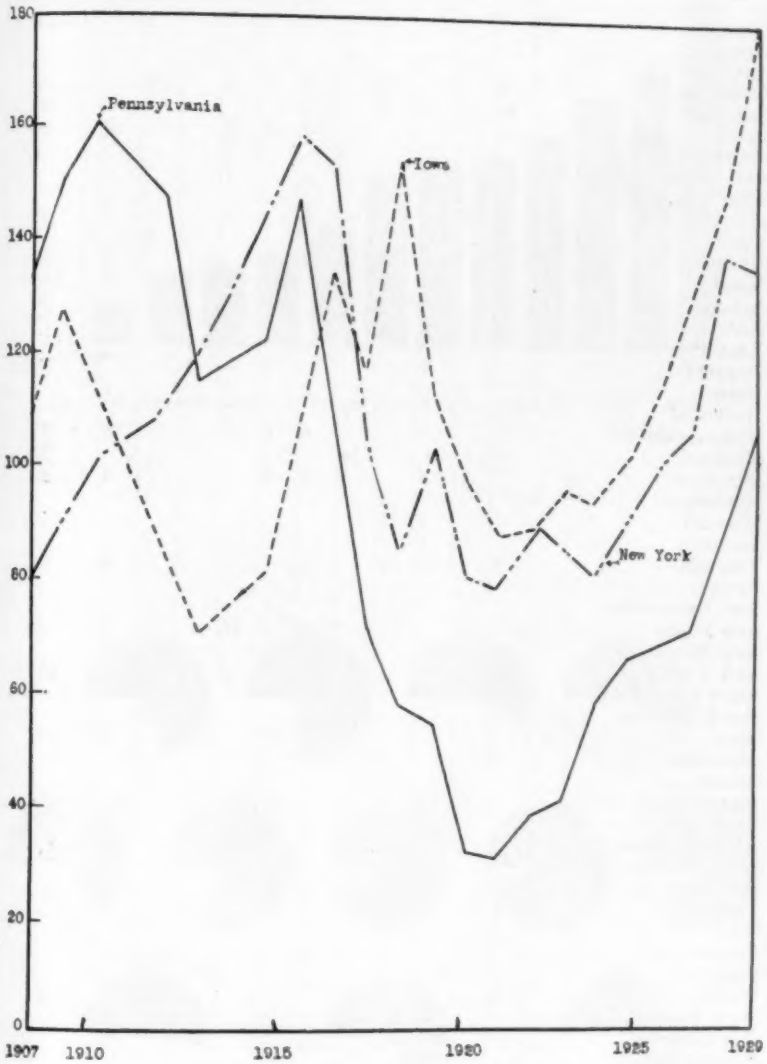


CHART 2 Student enrollment in three veterinary colleges, 1907-1929

TABLE I—*Origin of freshmen by states and distribution by schools (from reports of deans, 1925-1929)*

STATE	ALA.	COLO.	GA.	IOWA	KANS.	MICH.	N. Y.	OHIO	PENNA.	TEXAS	WASH.	ONT.	TOTAL
Alabama	23										1		24
Arizona													
Arkansas													
California		2			2		1	1	1		12		19
Colorado		94		1	2		1						98
Connecticut							3	2	3			2	10
Delaware									2				2
Dist. of Columbia									1				1
Florida													
Georgia	1		36				1		1				39
Idaho											1		1
Illinois		1		15	1	1	2	3				3	26
Iowa		1		159	8			1	1			2	173
Indiana				1				18	1				20
Kansas		1		1	76								78
Kentucky													
Louisiana				1						1			2
Maine			1				2		1			1	5
Maryland		1				1			2				4
Massachusetts							5	6	11			5	27
Michigan						34		1					35
Minnesota				14			1	3				4	22
Mississippi	2				2						1		5
Missouri				4	11								15
Montana				2							1		3
Nebraska		2		5	24		1					3	35
Nevada													
New Hampshire								7				1	8
New Jersey			1				8	2	16			1	28
New Mexico				1									1
New York				1	1		147	1	5		1	1	157
North Carolina	1				1	1		1					4
North Dakota				1							1		2
Ohio								101				2	103
Oklahoma					1								1
Oregon											5		5
Pennsylvania				4			4		78				86
Rhode Island							1		1			1	3
South Carolina	3		2					1	2				8
South Dakota				5			1					2	8
Tennessee					1		2						3
Texas		1					1			22			24
Utah		2											2
Vermont							3					1	4
Virginia				1								2	3
Washington		1									70		71
West Virginia				1				2				1	4
Wisconsin				4	1		2	2				2	11
Wyoming		1											1
Foreign	1	3		5	5	3	1	3		3	7	72	103
Not listed	4	1					1	2			6		14
Total freshmen	35	111	40	226	136	40	180	165	129	23	106	103	1,298
States represented in student body	5	11	4	18	13	4	14	20	15	2	9	17	

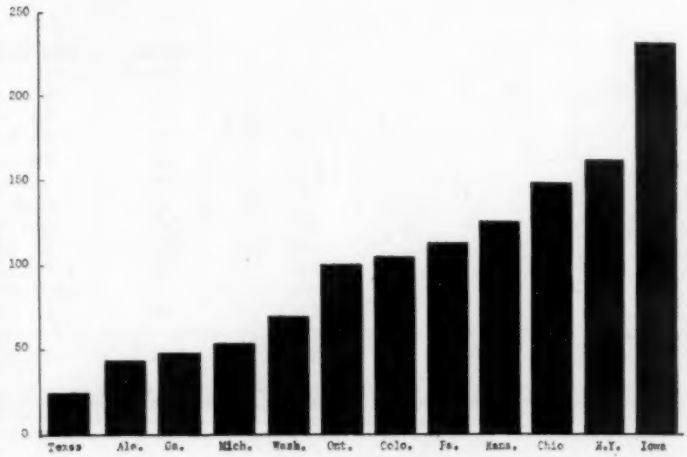


CHART 3. Student enrollment in twelve veterinary colleges, for the year 1930-1931.

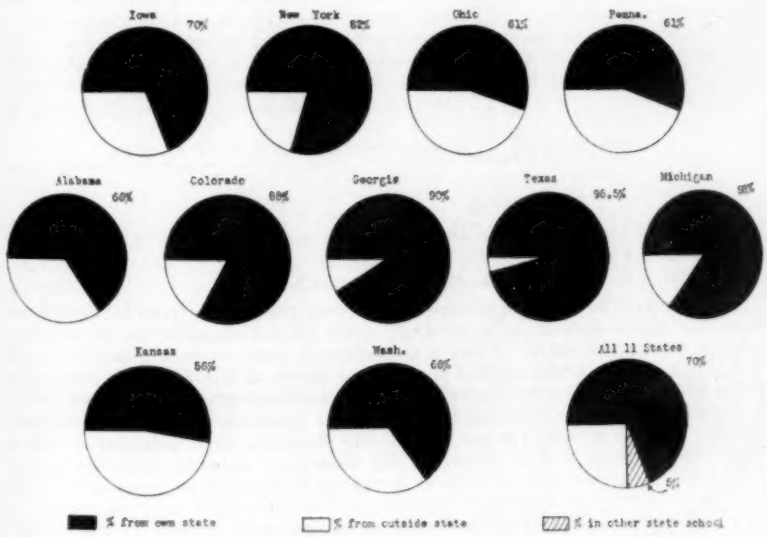


CHART 4. Proportion of freshmen from own state.

TABLE II—*Origin of freshmen chiefly from states containing schools*

STATE	FRESHMEN IN SCHOOL	FROM OWN STATE	
		NUMBER	PER CENT
Alabama	35	23	65.7
Colorado	111	94	84.7
Georgia	40	36	90.0
Iowa	226	159	70.4
Kansas	136	76	55.9
Michigan	40	34	85.0
New York	180	147	81.7
Ohio	165	101	61.3
Pennsylvania	129	78	61.2
Texas	23	22	95.5
Washington	106	78	66.1
Totals	1,191*	840	70.5

*Thirty-five students from the United States attend Canadian schools, making a total of 1,226 freshmen in 5 years, or an average of 245 per year.

AGE OF STUDENTS AT ENTRANCE

A study of the ages of 793 freshmen from six schools shows that the average age at entrance is 21.45 years. The distribution is shown in table III.

TABLE III—*Age of students at entrance*

AGE (YEARS)	STUDENTS
Under 18	24
18	125
19	154
20	132
21	108
22–25	165
26–30	67
31–35	16
Over 40	2
Total	793

PREPARATORY EDUCATION

The standard entrance requirement has been graduation from an approved four-year high school or its equivalent; some schools required 16 units; most schools required 15 units. There is undoubtedly some variation in the standard of the public school system in different parts of the country, but, with these variations, entrance has been at the high-school-graduation level.

Table IV throws interesting light upon the question of entrance requirements. In this group 21.9 per cent of the students have voluntarily taken some college work before entering the veterinary schools, and the group taking four years is nearly as large as the group having one or two years. This is to the credit of the veterinary students and is a fact that does not appear in any catalog statement on entrance and is not generally known by the public. This fall (1931), one school will require one year of college work for entrance, prescribing English, chemistry and biological sciences. This may be the beginning of the second general advance in entrance requirements. There is a realiza-

TABLE IV—*Preparatory education (freshmen, 1925-1929, in seven colleges)**

College	Students						Students with College Work	
	High School	College Work						
		Years				Time Not Stated	Number	%
		1	2	3	4			
Georgia	30	3	5	1	1		10	33.3
Iowa	136†	15	6	1	3		25	18.4
Kansas	122					14	14	11.5
New York	153‡					45	45	29.4
Ohio	153‡	2	5		14	9	30	19.6
Ontario	91	2	7	1	6		16	17.6
Pennsylvania	77	10	12	1	5		28	36.4
Texas	20	2			1		3	15.0
Totals	782	34	35	4	30	68	171	21.9

*No data available from four other institutions.
†Four classes only.
‡Six classes.

tion among the students and alumni, as there is among faculties, that the superstructure practically demands a better foundation. The very low attendance in the fore part of the decade was the reason, and still is the reason in most schools, for not advancing the entrance requirements. It is to be regretted that our public school system does not carry students preparing for college two years beyond the present high school course (as European schools do), so that the burden of proper preparation would not fall upon the colleges. With preparatory courses out of the way, there would be time enough in the four years to give a much more thorough course in the technical subjects and at the same time allow the student time to enter into the general university life which should serve to broaden his education in many ways.

Veterinary schools should consider very carefully, however, how much time and consequent expense should be required of all students. Veterinary practice at least, and most of the other phases of veterinary work, have an economic limit to their activities. Either opportunities must become better or the length of the course cannot become too great.

TABLE V—*Occupation of parents of veterinary students**

	Col.	Ga.	Ia.	Kan.	Ohio	Pa.	Texas	Ont.	Total	Per Cent
Farmer	52	23	138	53	82	22	3	64	437	45.9
Veterinarian	2	1	11	6	17	14	3	12	66	6.9
Doctor, dentist, druggist, nurse	7	4	9	1	3	3	1		28	2.9
Teacher, pastor, lawyer, engineer	6	1	5	4	11	6	1	1	35	3.8
Merchant, banker	9	6	25	8	8	17	3	28	104	10.9
Tradesman, salesman	12	1	39	5	31	24	5	1	118	12.4
Laborer	3	1	9	7	1	4	0	0	25	2.6
Miscellaneous	8	2	10	7	11	4	1	1	44	4.6
Not listed	12			45	19	13	6		95	10.0
Totals	111	39	246	136	183	107	23	107	952	100.0

*Records cover freshmen for the years 1925-1929, except in the case of Iowa. Here the records cover ten years (1915-1925).

Occupation of Parents

Table V speaks for itself. As might be expected, the largest group comes because of an interest in and experience with live stock. A fairly large number of sons of veterinarians follow their fathers' profession. No other group is particularly outstanding.

Part II. Schools of the United States

Names and Locations

The years 1917 to 1927 marked the passing of the privately owned veterinary schools. At the beginning of the last decade (1920), there were twenty veterinary schools in the United States, but nine were discontinued at about that time. The present schools are all state supported. One has some endowment to supplement the state support. The name,* location and date of establishment are as follows:

Alabama Polytechnic Institute, College of Veterinary Medicine, Auburn, Ala. (1907)
Colorado Agricultural College, Division of Veterinary Medicine, Fort Collins, Colo. (1907)
Georgia State College of Agriculture, Division of Veterinary Medicine, Athens, Ga. (1918)
Iowa State College, Division of Veterinary Medicine, Ames, Iowa. (1879)
Kansas State College, Division of Veterinary Medicine, Manhattan, Kans. (1905)
Michigan State College, Division of Veterinary Science, East Lansing, Mich. (1909)
New York State Veterinary College, Cornell University, Ithaca, N. Y. (1894)
Ohio State University, College of Veterinary Medicine, Columbus, Ohio. (1884)
University of Pennsylvania, School of Veterinary Medicine, Philadelphia, Pa. (1884)
Texas Agricultural and Mechanical College, School of Veterinary Medicine, College Station, Texas. (1916)
State College of Washington, College of Veterinary Medicine, Pullman, Wash. (1895)

Buildings and Equipment

It is difficult to obtain an accurate and equitable comparison of the schools on the basis of the cost of buildings and equipment. Some were built and equipped when materials and labor were cheap and others were built more recently. Some occupy very valuable land and others occupy land of ordinary farm land value. Using figures submitted by the deans of the various schools, the value of buildings and equipment varies from $25,000 to $516,000 (cost when built). Six or seven out of the eleven schools can be said to have buildings and equipment which would classify them as institutions or schools, while four are sorely lacking in physical equipment. Our best equipped schools do not compare with the best schools in Europe, and the poorest are not so well provided as the poorest schools in Europe. There seems to have been too much of a tendency to provide only what is needed to teach the undergraduate the bare necessities, instead of providing for the exhaustive development of each subject. Single departments or institutes in some of the schools in Europe have more room than some of our schools. Scientific equipment, working museums and modern hospital facilities are lacking in some and none too good in any school. Yet this is not the greatest need of our schools.

*In addition to these schools there are two schools in Canada, the Ontario Veterinary College, University of Toronto, Guelph, Ontario, and Université de Montréal, L'École de Médicine Vétérinaire, Oka, Quebec. The Committee at first tried to include these schools and their alumni in this study but conditions are different in Canada and the inclusion of Canadian schools made it difficult to get a true picture of the whole group. It seemed better to study the condition in one country.

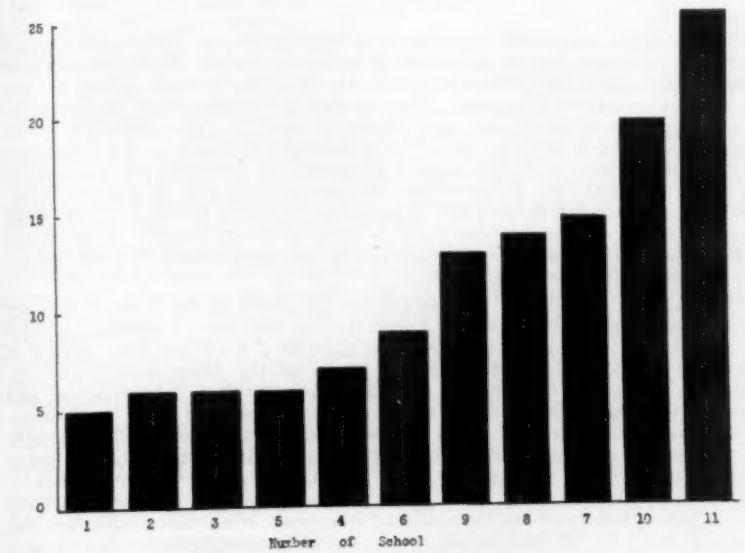


CHART 5. Number of veterinarians on faculties of eleven veterinary colleges, for the year 1929-1930.

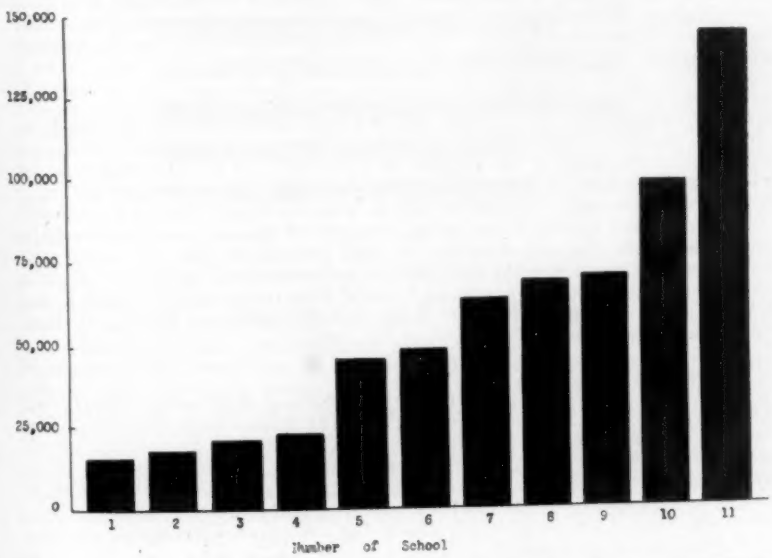


CHART 6. Support for salaries and research at eleven veterinary colleges, for the year 1929-1930.

Faculty

The number and training of the veterinarians on the faculty is another variant. As a rule, failure on the part of a state to supply physical equipment goes hand in hand with failure to supply an adequate faculty. There are one or two exceptions to this rule. The number of veterinarians on the staffs varies from five to twenty-six, as is shown in chart 5. The difference in the amount of research done in the different institutions might account for some of the differences in number of faculty members but some research is essential to any good teaching. If twenty-six are necessary in one institution surely five are much too few in another. Furthermore, as will be shown later, while there is some variation in the total number of hours taught, most of the schools with small faculties schedule nearly as many hours of work as the schools with larger faculties.

The training and fitness of teachers for the work to be done is another factor that is difficult to express. A poor teacher may have a superabundance of degrees and another with no degrees may be a good teacher. Years of study, experience and travel lie behind many of the older members of the faculties. They took all that was offered at the time they were in school and have proved themselves worthy by their accomplishments since graduation. There should be some way of giving academic credit to this group. The younger men should be required to fit themselves by postgraduate study before being given faculty rank. This will be done if it is the policy of the schools to demand and encourage it. The foundation should be laid in English, public speaking, language and the fundamental sciences. With this foundation the superstructure can be built in any direction. Those working in clinical subjects will never get beyond the art of veterinary medicine if they cannot themselves, or through their assistants, investigate the anatomical, physiological and bacteriological or pathological aspects of their work.

There should be established a scale of salaries and a system for promotion based on length of satisfactory service. Under the present system there is little incentive to enter the teaching profession. The average salary of veterinary teachers is $1,000 below the annual earnings of the average practitioner. Certainly those responsible for teaching should be of more than average ability and earning power. Faculty members in the various grades know only what they are getting at the present time. There is no assurance whatever that increases will come as a result of good service or that one will pass another as a result of his own initiative. No commercial organization could progress on this basis.

Support for Salaries and Research

In the preparation of chart 6 an attempt has been made to take out, from the total budget, (1) amounts which were derived from clinic income because that is paid out again in the support of the clinic and (2) amounts paid for upkeep and incidentals because in some institutions the veterinary school or division is not charged with these items, while in others they are included. The figures used represent the annual amount of money spent for teaching and research salaries and supplies. It will be noticed that the same wide difference exists as in chart 5 and that the order is nearly the same. Schools 10 and 11 are distinctly high, schools 7, 8 and 9 are in the middle position, and schools 1 to 7 are distinctly low. There is little justice in placing all these schools in one class.

Curriculum

Charts 7 to 19 have been prepared from catalog statements. Thirty-two weeks was taken as the standard length of the school year, including vacations and examination and registration periods. There are probably some discrepancies because it is very difficult for one person to understand the situation at the various schools from catalog statements, but on the whole these charts are certainly not far from the real situation and serve to form a basis for comparison of the institutions and of the time given to various subjects.

The average total number of hours is 4,203, which is at least 200 hours above that required in medical schools. Medical schools, however, can give

more time to technical subjects because entrance requirements are higher. Anatomy and clinics consume by far the most time. If the time in the clinics is well improved, the amount is justified because they really serve as laboratories in surgery and medicine and in a way supplement all other subjects. The hours devoted to anatomy seem to be out of proportion as compared to physiology, pharmacology, pathology and bacteriology.

As will be shown in the succeeding section, veterinarians are devoting 38 per cent of their time to cattle diseases or twice as much as to any other one species. Has the teaching been changed accordingly? Parasitology is another subject which needs more time even if it might be necessary to take time away from some of the long-established courses.

Too few of the teachers have received any training in methods of teaching and too few faculties have given much consideration to content of courses and correlation of courses, or concentration of courses as it affects the student's daily program. Most of the time schedules are so full that the student becomes physically tired, but has had little to exhaust him mentally. More of the responsibility of understanding the course should be thrown upon the student. That responsibility should be increased from freshman to senior year. Too often the reverse is true—the first two years are intellectually difficult and the last two are comparatively easy.

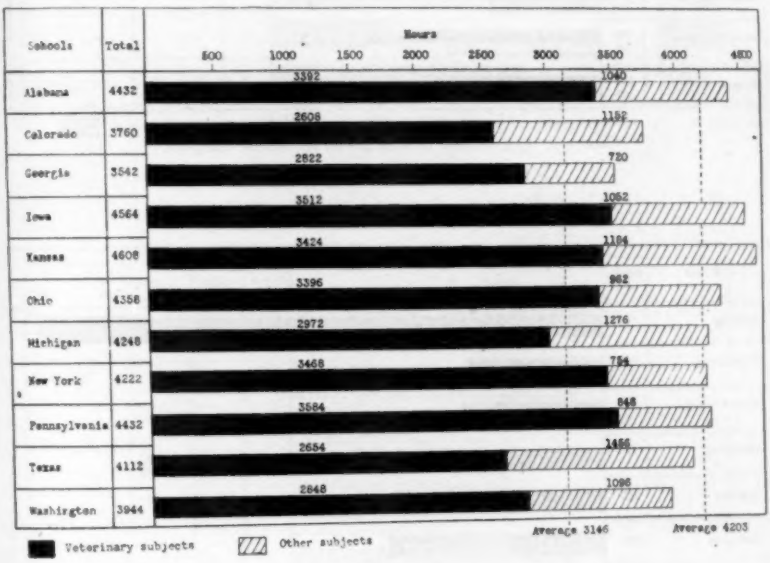


CHART 7. Total time given to veterinary and other subjects.

DEGREES AND GRADUATE COURSES

All schools in the United States give the degree Doctor of Veterinary Medicine at the completion of four years of nine months each. Some of the schools offer graduate work. Veterinary graduates are registered in the graduate school of the institution. They continue to do their work, at least their major, in the veterinary school, and after meeting the requirements are granted the degree Master of Science or Doctor of Philosophy. There is no advanced degree in veterinary medicine given in the United States. The Ontario Veterinary College grants the degree Bachelor of Veterinary Science after four years of seven months, Master of Veterinary Science after two more years of study, and Doctor of Veterinary Science after three years of special study and research in residence, or the latter degree is conferred for attainment in some line.

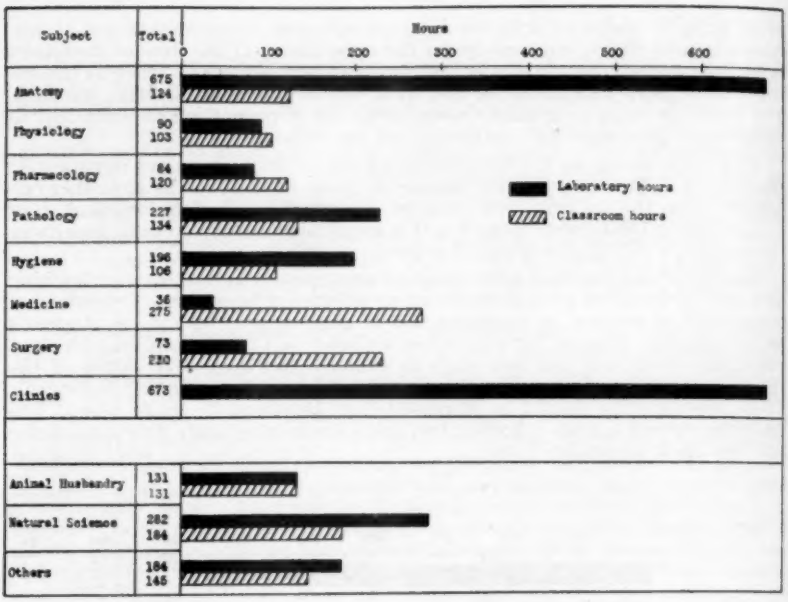


CHART 8. Comparison of time given to various subjects.

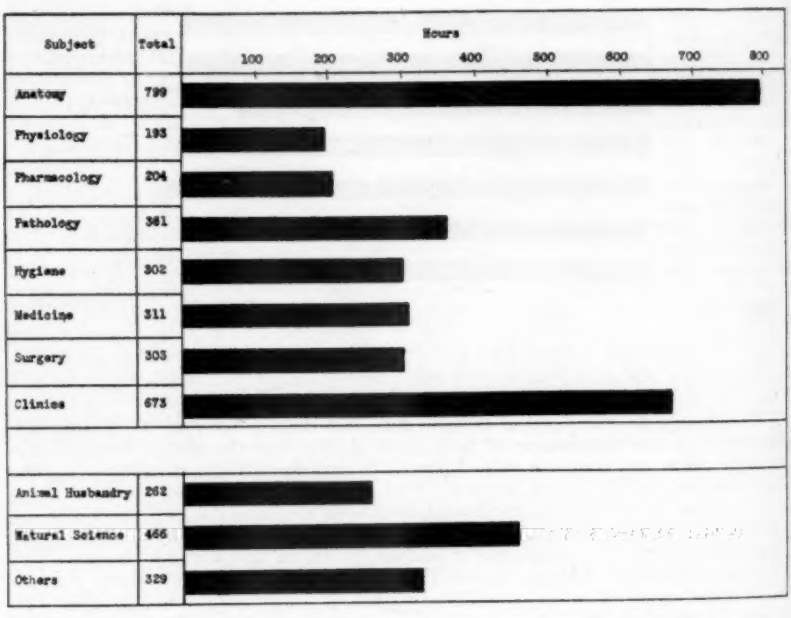


CHART 9. Total time (class and laboratory) given to various subjects in eleven veterinary colleges.

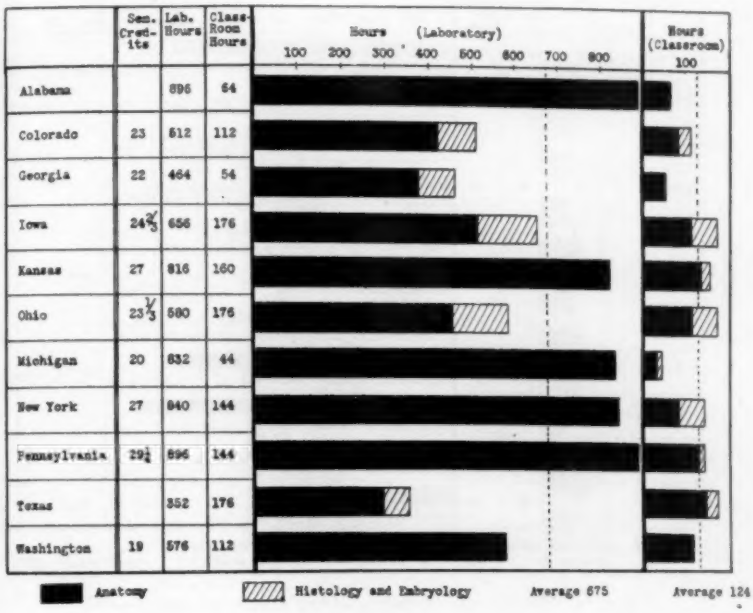


CHART 10. Anatomy.

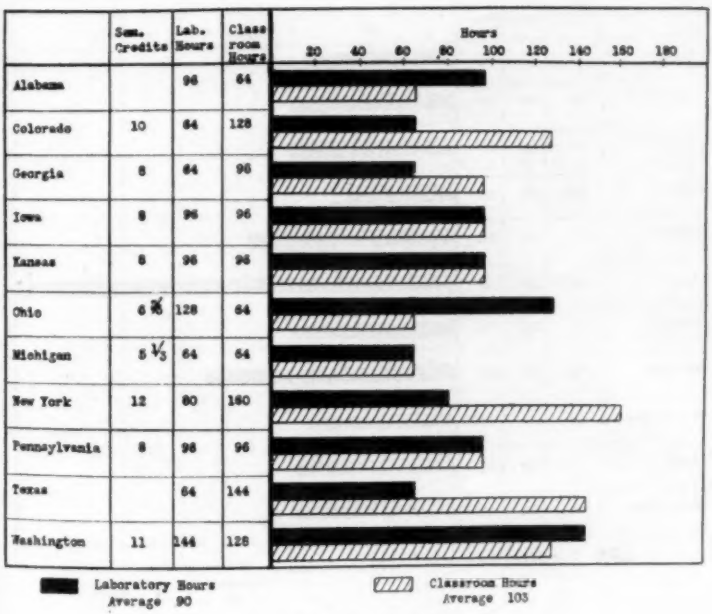


CHART 11. Physiology.

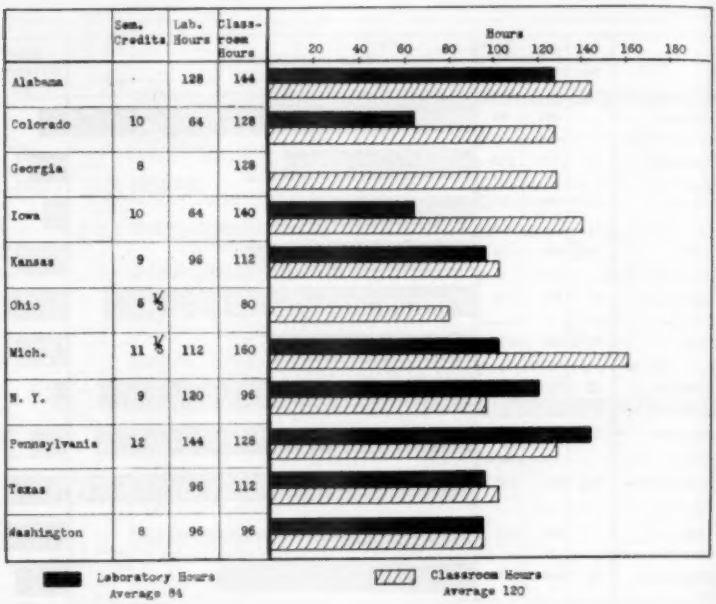


CHART 12. Pharmacology, including materia medica and therapeutics.

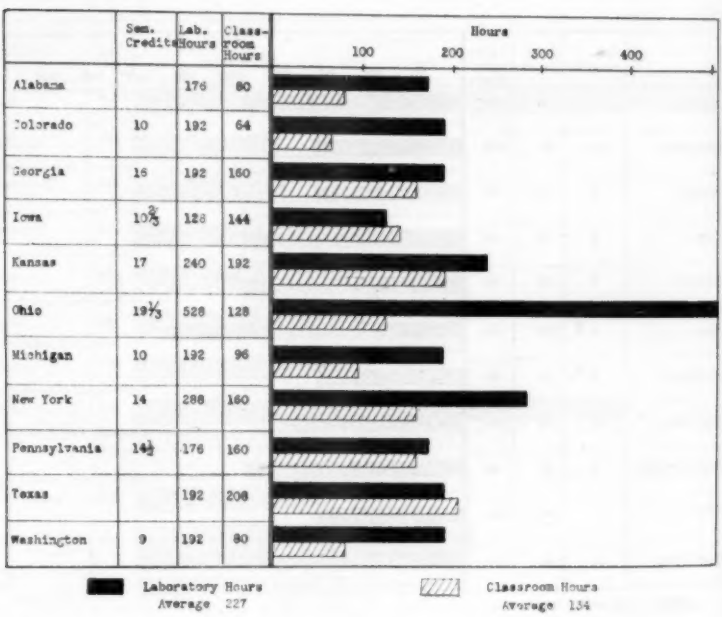


CHART 13. Pathology, including parasitology.

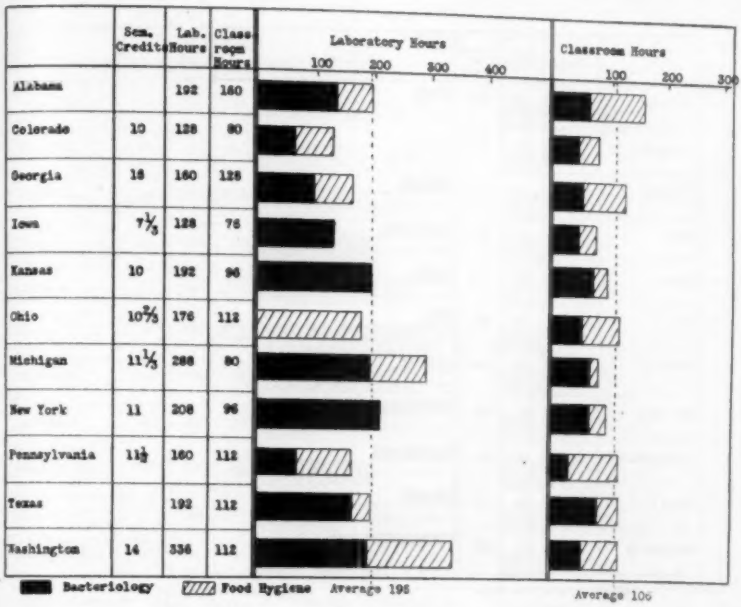


CHART 14. Hygiene.

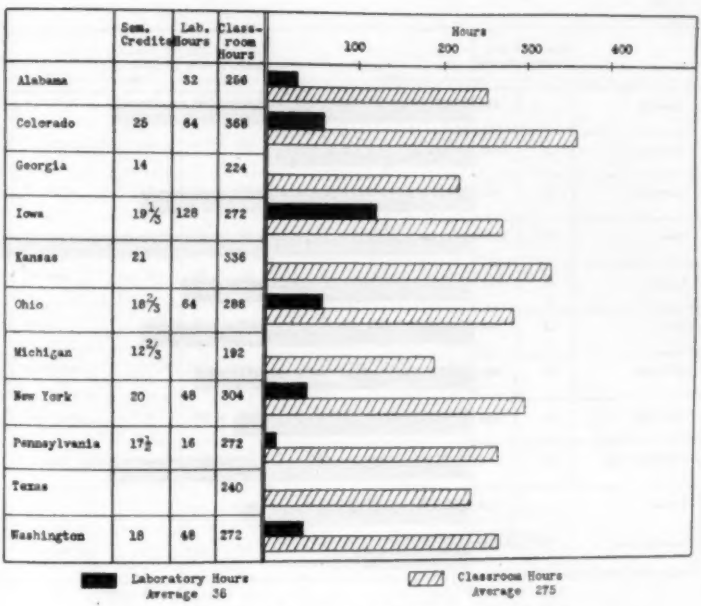


CHART 15. Medicine

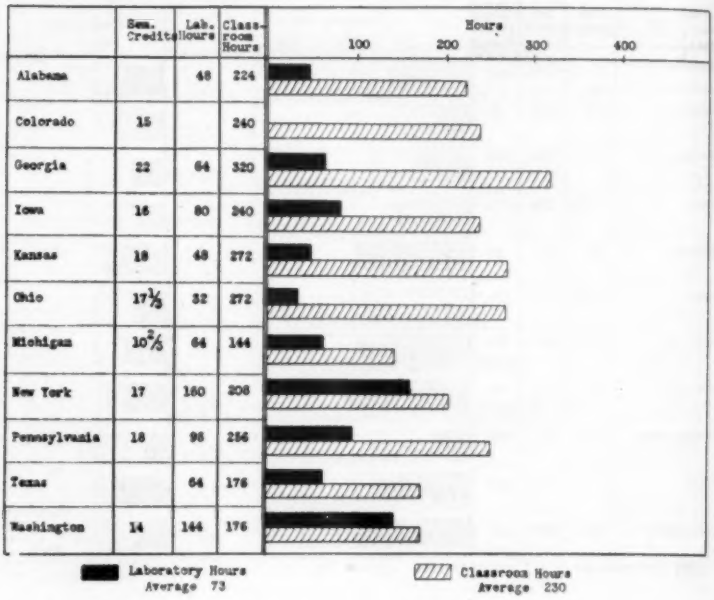


CHART 16. Surgery, including obstetrics.

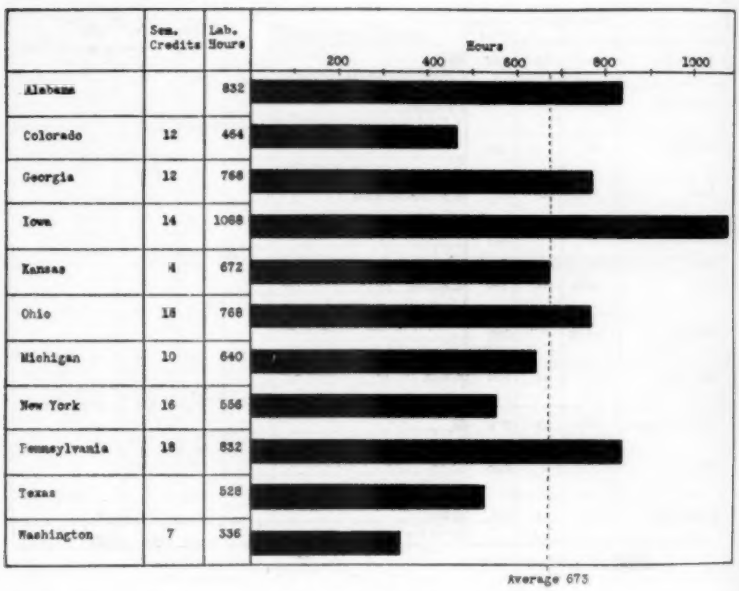


CHART 17. Clinics.

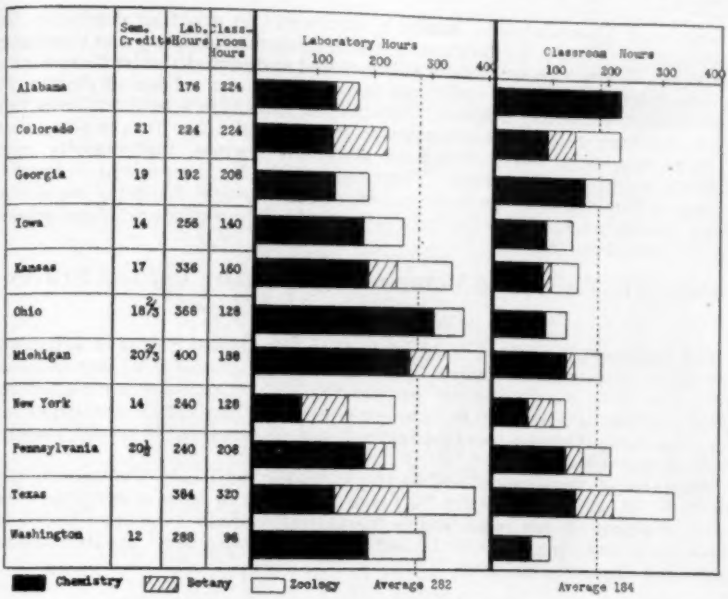


CHART 18. Sciences.

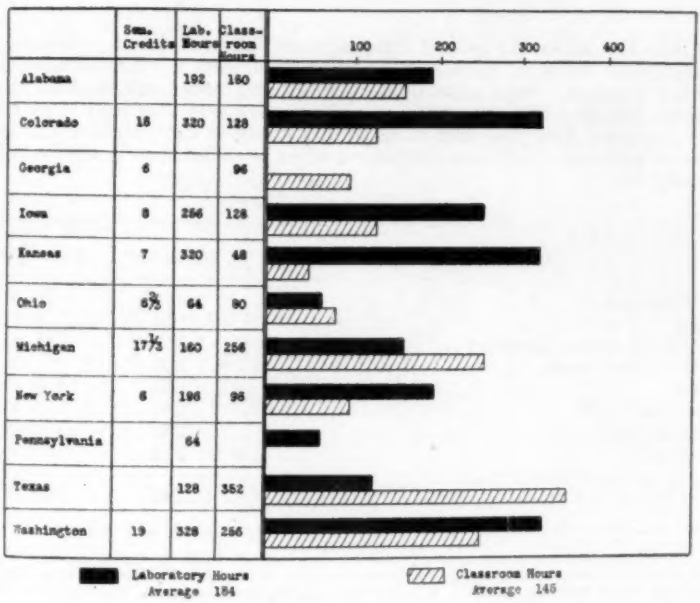


CHART 19. Other subjects, chiefly English, military science and physical education.

This order (baccalaureate, master's, doctorate) in granting degrees is the order used in all forms of education except in medicine, dentistry and veterinary medicine. A much better state of affairs would undoubtedly exist if veterinary colleges followed the usual order and created their own advanced degrees for work done in veterinary subjects. Graduation from high school and from four years of college leads to a baccalaureate degree in all other lines of education. If there was more work offered for advanced degrees, undoubtedly more students would strive for them. There seems to be little argument in favor of increasing the length of the basic course. Medicine and dentistry require no more, though many students study beyond the four years and some schools provide advanced degrees.

Part III. Graduate Veterinarians in the United States

Number

The number of graduate veterinarians in the United States is difficult to determine with exact accuracy. The number given in table VI was obtained from the state registers after all possible duplications were checked out. Most of these lists were up to date or quite recent, while some were especially prepared for the Committee. One or two others were several years old, possibly more or less inaccurate.

Our total of those registered in the 48 states is 10,701. The secretary of the A. V. M. A. reports 10,033.* There are 1,539 in federal service, a majority of whom are not registered in the various states.† We have added the two figures, making a total of 12,240 (table VI), who keep up their license permits or are in federal work.

Table VI—*Number of registered veterinarians*

Graduate veterinarians registered in states	10,701
Graduate veterinarians in federal work	1,539
Total in United States	12,240

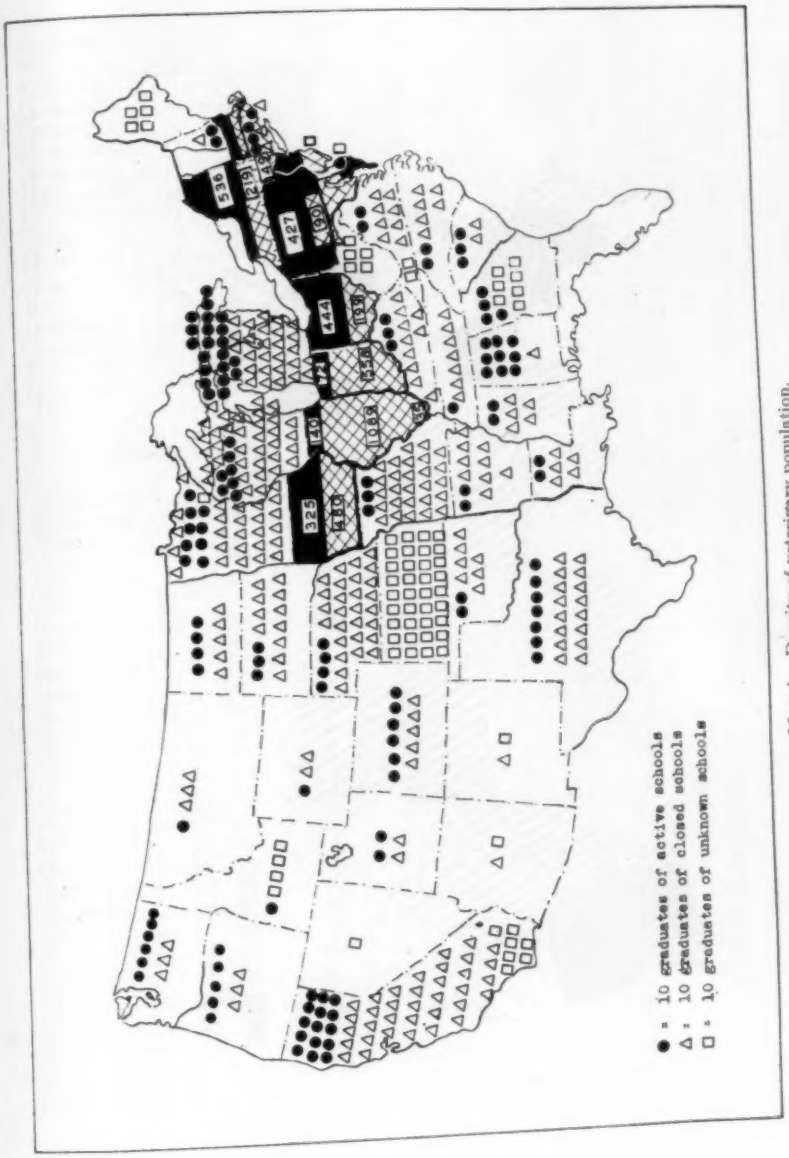
Table VII shows the general lines of work followed by the present-day veterinarian. Data on commercial and municipal work are the best available, but not complete. Some practitioners do city and state work, making classification difficult. The percentage of practitioners may run from 4 to 8 per cent too high. Compare with table XVI, a study of 925 veterinarians from their own records. Only such variations occur as differences in methodology account for.

Table VII—*Lines of work*

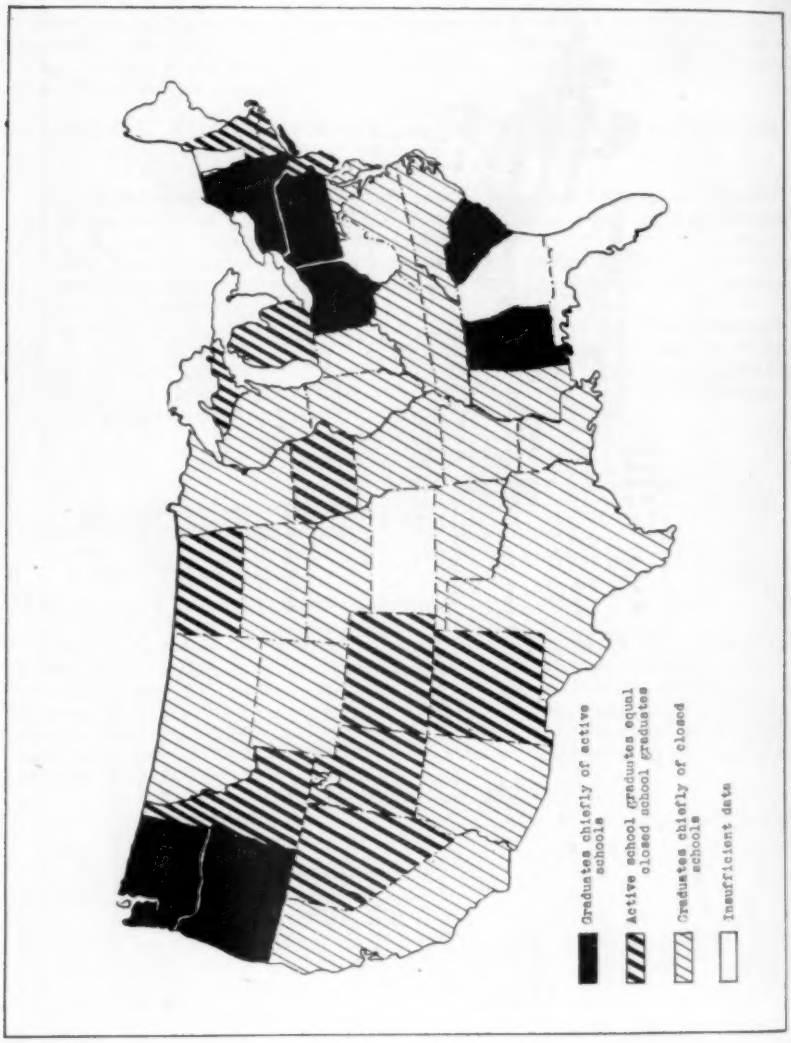
	Number	Per Cent
Practitioners	9,359	76.5
Army	126	1.0
Bureau of Animal Industry	1,353	11.1
Other federal work	60	.5
State	660	5.3
Teaching	230	1.9
Commercial	250	2.0
Municipal	202	1.7
Totals	12,240	100.0

*The survey of Land Grant Colleges and Universities, U. S. Department of the Interior, states that the 1920 census showed 13,466 veterinarians, and that at the present time there are probably not more than 11,000. Whether this number includes those who teach or are in regulatory work is not stated.

†Four per cent. (See table XVI.)



MAP A. Density of veterinary population.


Graduates chiefly of active schools
Active school graduates equal closed school graduates
Graduates chiefly of closed schools
Insufficient data

MAP B. Distribution of veterinarians, showing prevalence of graduates of closed schools.

TABLE VIII—*Distribution of graduate veterinarians (Corrected to July 1, 1930)*

STATE	TOTAL VETERINARIANS	GRADUATES OF ACTIVE SCHOOLS	GRADUATES OF CLOSED SCHOOLS	GRADUATES OF EUROPEAN SCHOOLS	GRADUATES OF SCHOOLS UNKNOWN	PERCENTAGE OF GRADUATES OF	
						ACTIVE SCHOOLS	CLOSED SCHOOLS
Alabama	104	90	14			86.5	13.5
Arizona	15	3	7		5*	20.0	46.7
Arkansas	98	20	78			20.4	79.6
California	564	147	348	5	64*	26.0	61.7
Colorado	111	60	51			54.1	45.9
Connecticut	91	52	37	1	1	37.1	40.7
Delaware	14	7			7		
Dist. of Col.	27	5	22			18.5	81.5
Florida	100	47	52		1	47.0	52.0
Georgia	118	44			74		
Idaho	46	26	19		1	56.5	41.3
Illinois	1,321	140	1,088	8	85*	10.6	82.3
Iowa	813	325	480		8	39.9	59.0
Indiana	630	72	558			11.4	88.6
Kansas	380	100	198		82	26.3	52.1
Kentucky	122	25	97			20.5	79.5
Louisiana	66	16	47	1	2	24.2	71.2
Maine	54				54		
Maryland	164	36	92	2	34	21.9	56.1
Massachusetts	304	147	147	5	5	48.4	48.4
Michigan	476	208	266	2		43.8	55.9
Minnesota	353	87	256	3	7	24.6	72.5
Mississippi	78	24	51		3	30.8	65.4
Missouri	306	33	272	1		10.7	88.8
Montana	46	13	32	1		28.1	69.5
Nebraska	324	44	276	4		14.1	84.7
Nevada	5	2	3			40.0	60.0
New Hampshire	34	17	14		3	50.0	41.2
New Jersey	160	85	65	4	6	53.1	40.6
New Mexico	14	4	6		4	28.5	42.8
New York	917	536	219	13	149*†	58.5	23.9
North Carolina	76	17	59			22.3	77.6
North Dakota	94	38	51	1	4	40.4	54.6
Ohio	653	444	199		10	68.0	30.5
Oklahoma	98	15	72		11	15.4	74.2
Oregon	78	47	31			60.2	39.7
Pennsylvania	524	427	90	7		81.5	17.1
Rhode Island	20	9	11			42.1	57.9
South Carolina	45	25	15	1	4	55.5	33.3
South Dakota	138	31	107			22.5	77.5
Tennessee	87	14	73			16.1	83.9
Texas	231	73	157	1		31.6	68.0
Utah	33	16	17			48.4	51.5
Vermont	65	42	22	1		66.1	34.8
Virginia	121	20	82		19	16.5	67.7
Washington	85	57	28			67.1	32.9
West Virginia	46				46		
Wisconsin	423	69	349	5		16.3	85.5
Wyoming	29	11	18			37.9	62.1
Totals	10,701‡	3,970	6,176	66	689	35.2	57.7

*Some of these may be non-graduates. Records were not clear.

†In New York State 298 were listed as "Unknown," "Certificate of Fact" or "Affidavit." According to the state code, some of these could be non-graduates. One hundred and forty-nine were listed with school unknown and 149 non-graduates.

‡This number is exclusive of those who are licensed in more than one state. Twenty-eight states listed 815 veterinarians whose homes and addresses were in other states. These names were compared with the home list in each case and the name was omitted from the second list As a result, there are no duplications due to multiple licenses.

MAP B. Distribution of veterinarians, showing prevalence of graduates of closed schools.

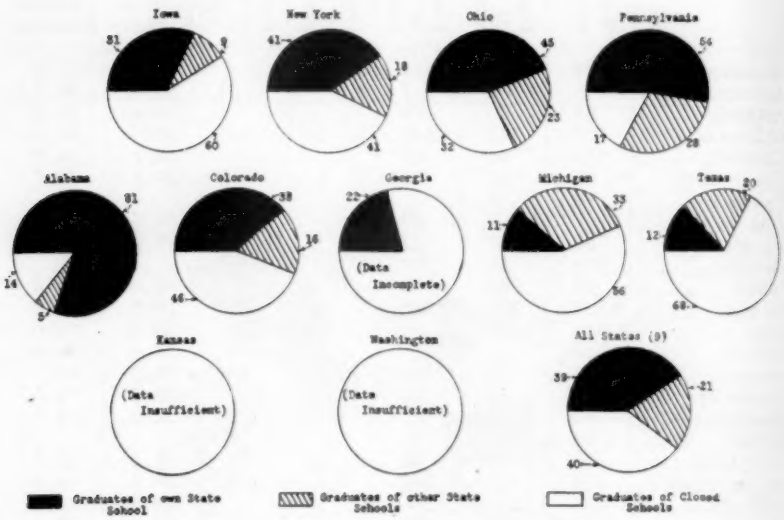


CHART 20. Proportion of veterinary practitioners, in eleven states, who are graduates of the state school, a school in another state, or a closed school.

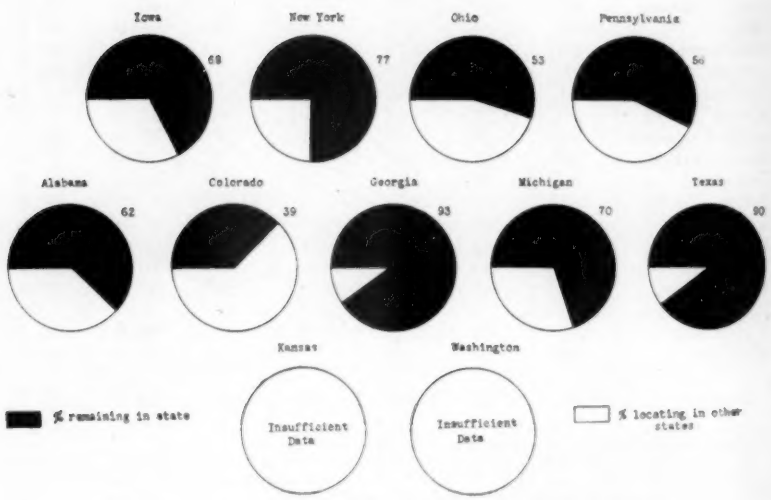


CHART 21. Percentage of state school graduates remaining in state.

Non-Graduate Veterinarians

Twelve states report non-graduate veterinarians as follows: Connecticut, 28; Idaho, 35; Illinois, 433; Iowa, 133; Kansas, 163; Missouri, 145, New Hampshire, 15; Pennsylvania, 163; South Dakota, 83; Texas, 107; West Virginia, 160; Wisconsin, 91; making a total of 1,558. Estimating the number of non-graduates in the other 36 states as 1,255 (pro rata), this would make the total non-graduates 2,803. The total number of graduates and non-graduates is 15,043, of which number the non-graduates consitute 18.6 per cent.

Distribution

The distribution of veterinarians in the various states is given in table VIII, which is corrected to July 1, 1930, with the exception of Illinois, which is probably too high. Some claim it should be reduced to 800. The gross distribution speaks for itself. Map A shows this distribution and the density of veterinary population.

The division of the number into graduates of active and closed schools was made for the purpose of emphasizing the task that lies before the active schools. Map B shows this task in a very telling manner.

There are eleven schools in the United States. It might be valuable and interesting to see how well these schools have provided their own states with veterinary service and what proportion of their graduates stay in the state in which they were graduated.

Charts 20 and 21 explain the situation with reference to the location of the graduates of the present schools. The percentage of graduates who stay in the home state is rather high in most cases. Yet in all states except Alabama, the home school has supplied only a small percentage of the veterinarians of the state. Chart 22 gives the situation in the school states, as compared with the states having no schools, and a composite picture of the situation in the country as a whole. (Data for these charts are found in tables IX, X and XI.)

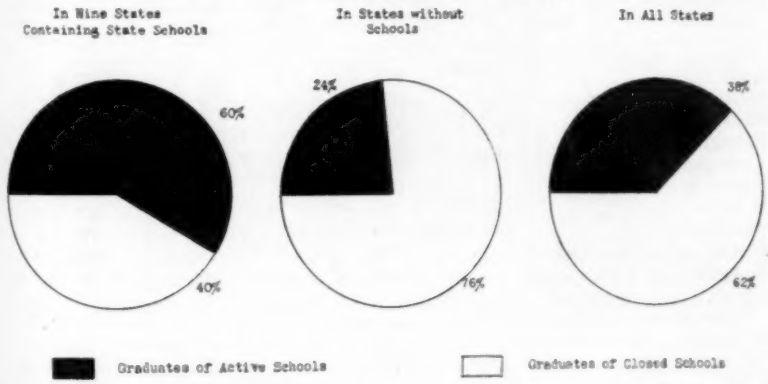


Chart 22. Ratio of graduates of active schools to graduates of closed schools in nine states containing schools; in other states and in all states.

Table IX—*Schools*

Graduates of	Number	Per Cent
Active schools	3,770	35.2
Closed schools	6,176	57.7
European schools	66	.6
Unknown schools	689	6.5
Total	10,701	100.0

TABLE X—*Ratio of graduates of the home school, who are located in the state, to all veterinarians of the state*

STATE	VETERINARIANS IN STATE	GRADUATES OF STATE'S OWN SCHOOL		GRADUATES OF OTHER STATE SCHOOLS
		NUMBER*	PER CENT	
Iowa	813	253	31.0	72
New York	917	379	41.3	157
Ohio	653	295	45.2	143
Pennsylvania	524	284	54.2	143
Alabama	104	84	80.8	6
Colorado	111	42	37.8	18
Georgia	118	26	22.0	
Michigan	476	52	10.9	156
Texas	231	27	11.6	46
Kansas	380	100	26.3	

*The number of graduates given for each school includes only those graduates who are registered in the respective states.

TABLE XI—*Ratio of total number of graduates of state schools to number of those graduates located in home state*

STATE	TOTAL GRADUATES OF STATE'S OWN SCHOOL	GRADUATES LOCATED IN HOME STATE	
		NUMBER	PER CENT
Iowa	370	253	68.0
New York	495	379	76.6
Ohio	554	295	53.2
Pennsylvania	508	284	55.9
Alabama	135	84	62.2
Colorado	109	42	38.5
Georgia	28	26	92.8
Michigan	74	52	70.3
Texas	30	27	90.0
Kansas*	300	100	33.3

*Material received too late for inclusion in charts.

CAUSES UNDERLYING PRESENT LOCATION OF VETERINARIANS

Just what are the factors that have had the greatest influence in determining the density of veterinary population? Various answers have been advanced, declaring that the number of veterinarians varies according to the number of various kinds of live stock, or of general population, or according to the value of live stock, or even to per capita wealth. The degree to which each of these has been an influencing factor in determining veterinary population can be and has been accurately determined by computing the coefficient of correlation. Consulting table XII, it will be seen that the number of veterinarians is correlated more closely with the value of cattle (.89), next to the value of horses (.81) and to per capita wealth (.81), and third to the value of swine (.75) and to general population (.75). Note that the numbers are less potent than valuations. One (1) is a perfect correlation. These correlations are computed on data of state values, summary of which is found in table XIII.

TABLE XII—*Correlation of distribution of veterinary population*

CAUSE AFFECTING DISTRIBUTION	CORRELATED TO (r) VETERINARY POPULATION	P. E. r	r VARIES
Value of cattle.....	.89	.0196	.87 to .91
Value of horses....	.81	.033	.78 to .84
Per capita wealth..	.81	.033	.78 to .84
Value of swine.....	.75	.043	.71 to .79
General population.	.75	.043	.71 to .79
Number of cattle ..	.67	.053	.62 to .72
Number of horses..	.59	.063	.53 to .65
Number of swine...	.36	.086	.27 to .45

$$r = \frac{\Sigma xy}{\sqrt{\Sigma x^2}\sqrt{\Sigma y^2}}$$

r must be $>$ 3 P. E.

TABLE XIII—*Number and value of live stock in the United States**

CLASS OF LIVE STOCK	NUMBER	VALUE PER HEAD	TOTAL VALUE
Cattle.....	55,751,000	$59.35	$3,308,000,000
Horses.....	14,029,000	69.95	981,000,000
Mules.....	5,447,000	82.20	448,000,000
Hogs.....	57,374,000	13.01	747,000,000
Sheep.....	47,699,000	10.60	506,000,000
Poultry.....	441,731,000	.9161	1,000,000,000
		Grand Total	$6,990,000,000

*From 1930 Year-Book, U. S. Department of Agriculture.
Population in United States in 1928—120,000,000.
Veterinary population in United States in 1929—12,000.
Per capita wealth in 1929—$2,977.

AGE OF VETERINARIANS

Of 526 veterinarians answering the questionnaires, the average age is 43.2 years. The ages of 1042 given in state registers average 43.7. The greatest number are between the ranges 36-40 and 41-45, with an average of 43.54 for the 1,568 men, as shown in chart 23.

Chart 24 shows that the number of older men (above 30) being graduated is about the same now as formerly, while the number of very young graduates (20-21-22) is materially decreasing.

RATIO OF SUPPLY TO NEED

The number of veterinarians in the United States is approximately 12,240. To make computation easier, 1224 (table XIV) cases, or one-tenth the whole number, were taken and of these, 20 were found to be over 70. Therefore, pro rata, 12,040 are 70 or younger. Starting with this number in 1930 and making calculations according to the American-Canadian Mortality Investigation 1900 to 1915—"American Men Ultimate," table XV results.

SIGNIFICANCE

The figure of graduating 300 per year is based on keeping up the present number of veterinarians. The factors that tend to make this number seem too small, when carefully analyzed, almost exactly balance those that make it seem too large.

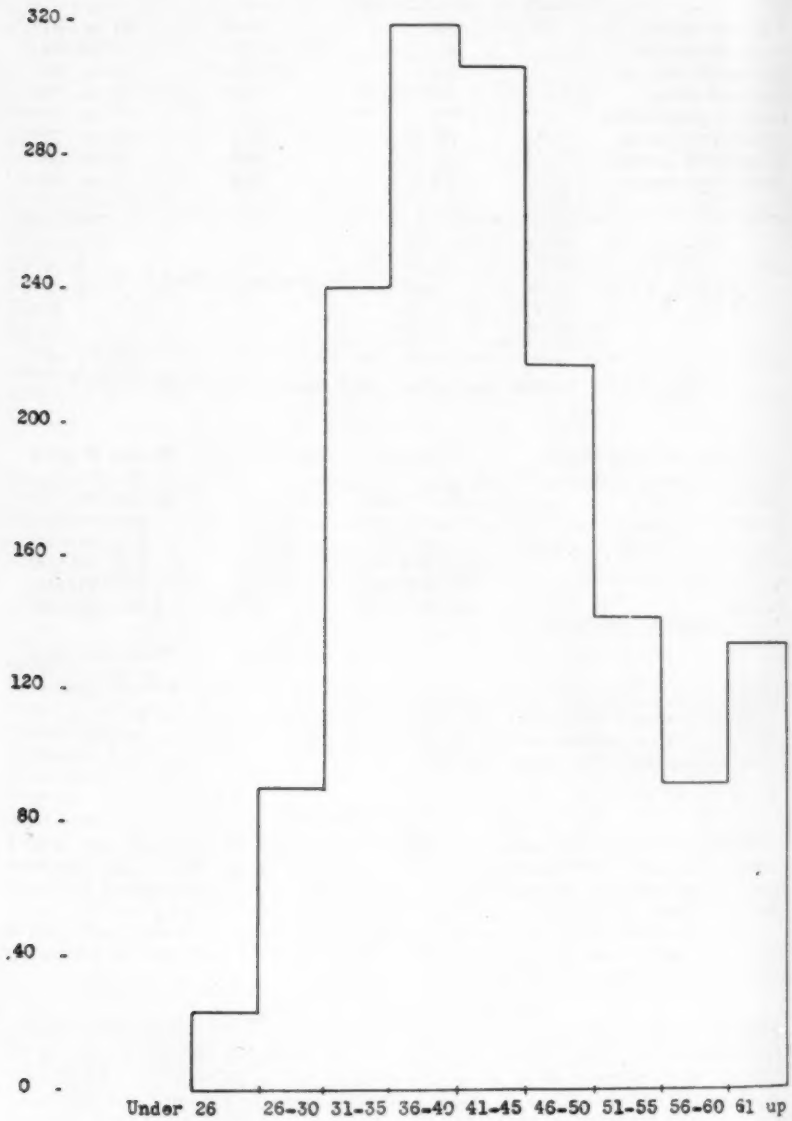


CHART 23. Present age of 1568 veterinarians (average age, 43.5.)

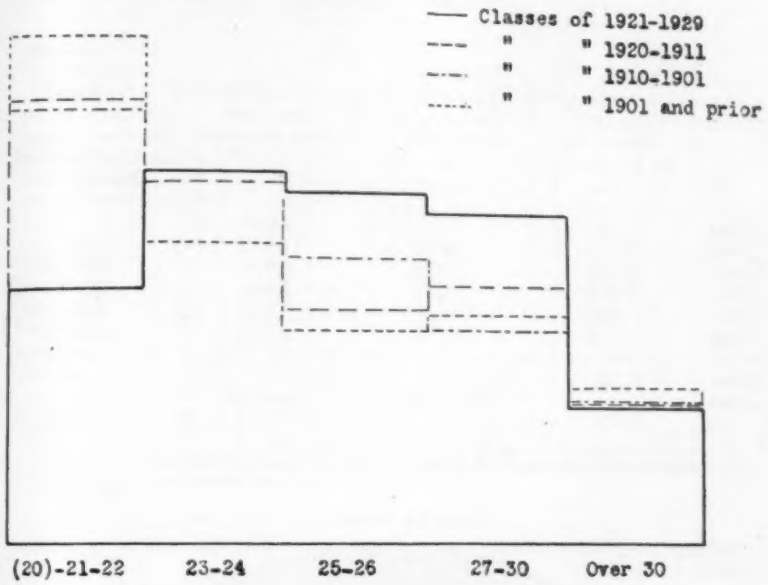


Chart 24. Age at graduation, by ten-year periods.

TABLE XIV—*Age distribution of 1,224 veterinarians*

AGE	NUMBER	AGE	NUMBER	AGE	NUMBER
21	3	41	46	61	21
22	1	42	45	62	13
23	4	43	42	63	13
24	5	44	49	64	8
25	6	45	53	65	7
26	8	46	33	66	7
27	11	47	40	67	6
28	17	48	36	68	7
29	17	49	26	69	3
30	15	50	38	70	5
31	17	51	21	71	3
32	34	52	25	72	5
33	30	53	24	73	3
34	45	54	19	74	2
35	55	55	25	75	3
36	50	56	14	77	1
37	35	57	18	79	1
38	56	58	17	80	1
39	42	59	9	81	1
40	63	60	20		

As 75 per cent of the freshmen are graduated, there should be 400 freshmen, 350 sophomores, 350 juniors and 300 seniors, making a total of 1400 students needed in the veterinary schools to keep up the present number. Numerically, this does not sound so difficult, but actually it means doubling the average attendance (709) of the decade ended, June, 1930.

TABLE XV—*Mortality*

YEAR	NUMBER IN PRESENT GROUP UP TO 70 YEARS	NUMBER IN NEW GROUP GRADUATED AT THE RATE OF 152 PER YEAR*	TOTAL OF OLD AND NEW GROUPS	TO MAINTAIN PRESENT NUMBER OTHERS MUST BE GRADUATED AT THE ANNUAL RATE OF†
1930	12,040		12,040	
1940	9,923	1,490	11,413	234
1950	7,067	2,909	9,976	269
1960	3,320	4,221	7,541	321
1970	495	5,327	5,822	335
1980	0	5,828	5,828	319
After 1980		Constant	Constant	296

*The average number of seniors for the last decade was 152.
†Computation work directed by Provident Mutual Life Insurance Company.

LINES OF WORK

Returns from 925 veterinarians in eleven states show the following division of labor (table XVI):

Over 72.6 per cent of the veterinarians in these states are engaged in practice. The remaining 27.4 per cent are divided into small groups serving county, state or city government. This indicates that the major emphasis in the schools should be placed on the preparation of the practitioner. Those interested in the other lines should receive special preparation for the line chosen after completing the fundamental course.

An analysis of the time devoted to the various species on the part of those in practice shows that the chief emphasis should be placed upon the diseases of cattle (table XVII). This is shown graphically in chart 25.

TABLE XVI—*Lines of work, based on information supplied by 925 veterinarians*

STATE	PRACTICE	FEDERAL	STATE	COUNTY	MUNICIPAL	TEACHING	COMMERCIAL	MISCELLANEOUS	TOTALS
New York...	176	9	19	15	5	4	25	7	260
Pennsylvania	106	1	19		3	7	10	5	151
Connecticut	17	1	3		1			2	24
Ohio	64	3	2		5	2	3	4	83
Iowa	133	2	5	1	1	4	2		148
Minnesota	33	2	1			3	1		40
Washington	16		3			2			21
California	40	10	10		2	1			63
Texas	59	5	1		4	4	3	4	80
Alabama	7	1	1	2	3				14
Georgia	21	3	4	2	5	4		2	41
Totals	672	37*	68	20	29	31	44	24	925
Per cent	72.6	4.0	7.3	2.2	3.1	3.3	4.8	2.6	

*Of this number, 10 are in Army service.

TABLE XVII—*Percentage of time given to each species, based on data furnished by 618 veterinarans*

STATE	HORSES	CATTLE	SHEEP	SWINE	POULTRY	PETS	VETERINARIANS REPORTING
New York	23.1*	42.0	1.4	2.2	.9	30.4	164
Pennsylvania	18.3	43.6	1.0	3.8	2.8	30.4	93
Connecticut	9.9	34.2	.4	3.4	.9	51.1	16
Ohio	15.5	32.5	3.4	18.8	6.3	23.4	60
Iowa	14.8	29.1	4.3	41.3	6.3	4.2	117
Minnesota	21.0	51.3	3.5	19.1	3.5	1.9	33
Washington	17.0	53.5	3.3	2.1	.5	23.4	16
California	19.8	37.4	1.6	6.0	1.0	33.9	39
Texas	16.2	36.5	3.2	7.2	2.0	34.5	46
Alabama	22.2	30.5	0.0	6.1	1.0	40.2	6
Georgia	20.8	22.8	.1	34.6	.7	21.5	18
Average	18.5	38.0	2.3	14.1	3.0	23.9	608

*To be read: 23.1 per cent of all the time of 164 practitioners in New York State is given to horses, 42 per cent of their time to cattle, etc.

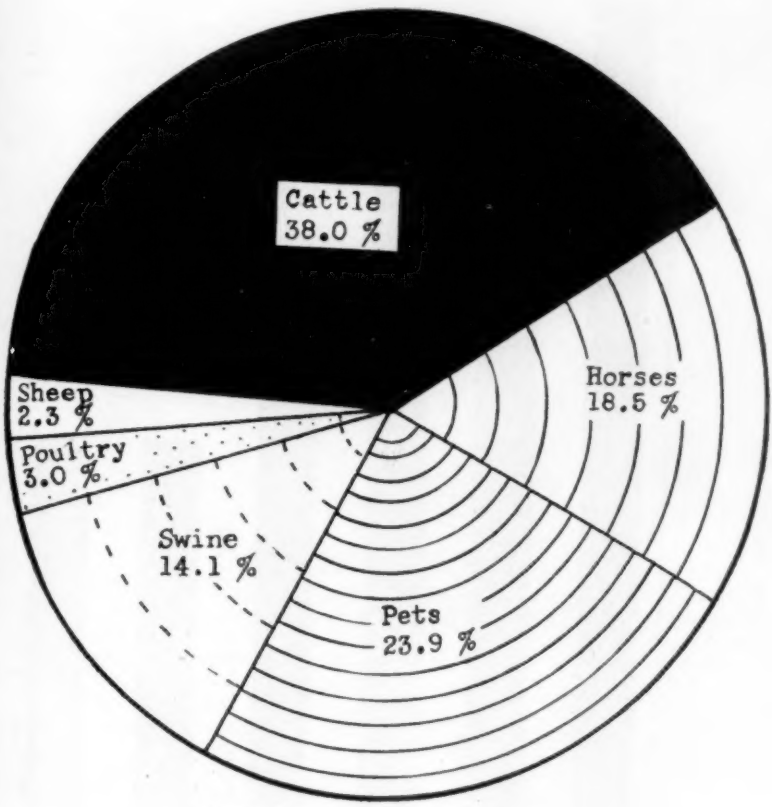


CHART 25. Distribution of time in practice.

TABLE XVIII—*Number of men giving some time to the species indicated (611 veterinarians reporting)*

STATE	HORSES	CATTLE	SHEEP	SWINE	POULTRY	PETS	PRACTITIONERS
New York	157	144	40	44	34	146	164
Pennsylvania	83	81	31	57	48	84	93
Connecticut	14	12	2	7	3	16	16
Ohio	61	61	49	60	47	58	63
Iowa	114	117	83	115	98	73	117
Minnesota	33	33	16	29	18	11	33
Washington	14	15	9	9	4	14	16
California	31	30	10	20	6	31	39
Texas	37	40	19	31	20	43	46
Alabama	6	6	0	4	2	6	6
Georgia	18	18	2	15	4	17	18
Totals	568	557	261	391	284	499	611
Percentages	92.9	91.1	42.7	63.9	46.5	81.1	

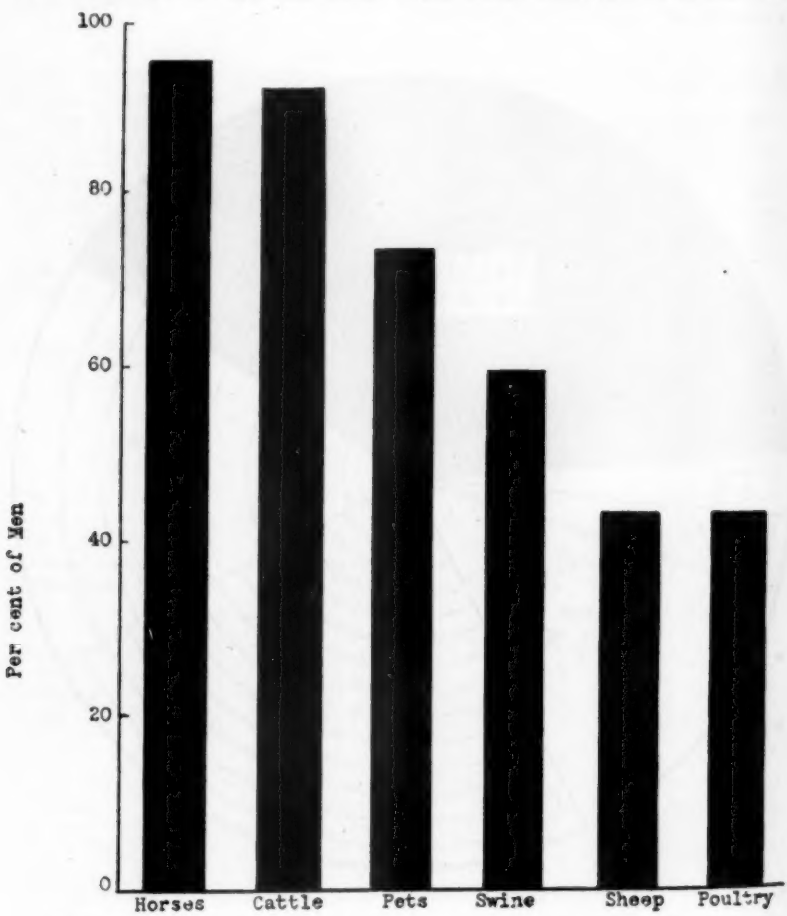


CHART 26. Number of men giving some time to various species (389 practitioners).

Analyzing practice in another way, however, table XVIII shows the necessity of a knowledge of the diseases of all species on the part of a large majority of practitioners. A large number of men give some time to sheep and poultry practice as well as to other species, a fact which has not been generally recognized heretofore. (See chart 26.)

The amount of specialization in veterinary practice is shown in table XIX.

TABLE XIX—*Specialization of practice (high percentage of time given to one species by 608 practitioners)*

CLASS	90–100% OF TOTAL TIME	75–89% OF TOTAL TIME	TOTAL	PER CENT
Horses	11	2	13	2.1
Cattle	21	43	64	10.5
Pets	41	25	69	11.2
Swine	0	7	7	1.2
Totals	73	77	150	
Percentages	12.0	13.1	25.1	

Table XX shows that cattle and horses and mules are receiving about the right proportion of time according to their value, while sheep and poultry should receive more time, and swine are receiving more time than they deserve.

TABLE XX—*Proportion of time to value of animals*

CLASS	PERCENTAGE OF TIME GIVEN BY VETERINARIAN	PERCENTAGE OF VALUATION
Cattle	38.0	35.8
Horses and mules	18.5	15.5
Sheep	2.3	8.1
Swine	14.1	5.5
Poultry	3.0	10.9
Totals	75.9	75.8
Pets	23.9	No estimate

EARNINGS OF VETERINARIANS

It is difficult to obtain accurate information on earnings of practitioners. Some hesitate to make any statement at all and often when a statement is made it is not clear whether it is net or gross. The figures given here have been checked against studies of two alumni groups (Iowa and Pennsylvania) with which they agree very closely (table XXI).

Some have said that the average seemed too high. The maximum earnings are of course much higher above the average than the minimum are below. The median, which may be a more reliable figure, is $4020.33. The mode, or the one recurring most frequently, is $3,000. Table XXII is given here for the benefit of those who wish to study the distribution.

Salaries of other groups are shown in table XXIII.

TABLE XXI—*Earnings of 417 practitioners in eleven states*

STATE	HIGHEST		LOWEST		AVERAGE FOR STATE
	1/10	¼	¼	1/10	
1	$15,000.00	$14,667.00	$ 2,200.00	$ 1,100.00	$ 7,065.38
2	10,500.00	8,588.00	2,550.00	2,071.00	4,924.28
3	9,733.00	7,800.00	2,257.00	1,600.00	4,905.00
4	12,500.00	9,00.000	1,917.00	1,320.00	4,661.58
5	9,375.00	7,833.00	2,252.00	1,812.50	4,421.00
6	10,250.00	7,360.00	2,117.00	1,350.00	4,236.00
7	8,883.00	6,469.00	2,444.00	1,933.00	3,969.35
8	7,625.00	6,450.00	1,640.00	1,250.00	3,734.80
9	10,000.00	7,333.00	1,500.00	1,000.00	3,605.00
10	7,500.00	5,800.00	2,062.50	1,675.00	3,580.00
11	6,000.00	6,000.00	1,500.00	1,500.00	3,220.00
Averages for 417 practitioners....	$10,747.62	$ 8,074.52	$ 2,060.57	$ 1,510.71	$ 4,487.78

TABLE XXII—*Actual earnings for 417 practitioners in eleven states*

NUMBER	EARNINGS	NUMBER	EARNINGS	NUMBER	EARNINGS
1	$25,000.00	6	$6,500.00	53	$3,000.00
1	17,000.00	27	6,000.00		
4	15,000.00	9	5,500.00	6	3,000.00
2	14,000.00	2	5,400.00	2	2,800.00
1	13,500.00	1	5,100.00	1	2,750.00
3	12,000.00			2	2,700.00
1	11,800.00	42	5,000.00	1	2,650.00
10	10,000.00	1	4,900.00	25	2,500.00
1	9,500.00	2	4,800.00	8	2,400.00
5	9,000.00	2	4,750.00	1	2,300.00
2	8,500.00	1	4,700.00	1	2,250.00
1	8,400.00	14	4,500.00	1	2,200.00
1	8,200.00	1	4,400.00	14	2,000.00
9	8,000.00	1	4,300.00		
		2	4,250.00	9	2,000.00
1	7,983.00	1	4,200.00	1	1,900.00
1	7,850.00	1	4,161.50	7	1,800.00
1	7,800.00	46	4,000.00	1	1,600.00
3	7,500.00	1	3,900.00	10	1,500.00
1	7,200.00	2	3,800.00	1	1,350.00
5	7,000.00	4	3,750.00	2	1,200.00
1	6,900.00	1	3,720.00	1	1,100.00
1	6,800.00	1	3,600.00	8	1,000.00
1	6,700.00	29	3,500.00	1	900.00
1	6,620.00	3	3,200.00	1	600.00
1	6,660.00	1	3,100.00		

Average..... $4,489.52
Median..... 4,025.33
Mode..... 3,000.00

TABLE XXIII—*Comparison of salaries and earnings in various lines of work*

LINE OF WORK	VETERINARIANS	HIGH	LOW	AVERAGE
Army	126	$ 7,200	$ 2,271	$ 4,476
Bureau of Animal Industry	1,353	7,500	2,000	2,837
Other federal work	60	6,000	2,100	3,516
State	660	6,000	1,500	2,652
Municipal	202	5,000	1,200	2,586
Practice	9,359	25,000	600	4,490
Teaching	230	7,500	1,500	3,581
Commercial	250			
Total	12,240			

Part IV. Conclusions

RECOMMENDATIONS

As a result of the above study, Dr. Bemis felt that there were certain imperative needs of veterinary education. He would have made a number of recommendations, along the following lines:

1. The veterinary schools should be graded as Class A or Class B. Those in Class A should have as a minimum standard a type of education much above the average of the present schools. The minimum requirement for Class B should be about the average of the veterinary schools of today. As this would place from four to six schools in Class B and only one or two, if any, in Class A, a temporary class (C) should be created for the four to six schools below the present average. A definite period of time, not to exceed five years, should be allowed for these schools to meet Class B requirements. At the expiration of this time, Class C should be eliminated and schools not meeting the requirements of Class B should be stricken from the list approved by the American Veterinary Medical Association.

II. A Council of Veterinary Education should be created, consisting of the deans of Class A schools (also Class B temporarily) to formulate veterinary educational standards and to conduct veterinary *educational research*. If the Council finds it advisable, the A. V. M. A. should provide funds for an educational secretary, as maintained by other leading professions.

III. In order to encourage Class B and Class C schools to progress to the next class, a definite score card or rating should be sympathetically drawn up for each school individually, to contain among other things the following standards:

A. Faculty: As the crux of progressive education is the faculties, there should be definite minimum standards. These are suggestions:

1. New men (and those not on faculties ten years) should not advance beyond the rank of instructor without advanced degrees.

2. Ten should be the minimum number of veterinarians on faculties of Class B schools, and 18 to 20 for Class A schools.

3. Salaries should progress rapidly upward, with definite opportunities for advancement. There should be salary variations by schools, because of different living costs. (It is easily conceivable that a professor attached to a school in some small town and receiving a salary of $5000, would be paid better in actual living values than a professor on the faculty of a school located in some large city and receiving $10,000.)

4. There should be a definite maximum number of teaching and laboratory hours, to vary by departments.

5. There should be departmental organization of not less than five veterinary departments for Class B schools.

B. Buildings and equipment: These should be measured by their adequacy, rather than their estimated cost or local values. Though three or four schools need much better facilities, these needs should not be overemphasized in the present general veterinary educational situation.

C. Curriculum: The curriculum needs reorganization but, with increased faculties, this would be cared for. The content of many courses needs revision, the number of hours needs to be reduced to provide for more intellectual work, the subject matter needs grading in difficulty to correspond to the degree of advancement of the student, and better clinical teaching should be insisted on.

D. A definite graduate program and a definite research plan: These must be offered by any school to be eligible to Class A rating. The greatest need of the profession is for a future leadership well grounded in graduate work. The day is rapidly passing, when leadership earned in non-academic ways will retain recognition for the veterinary profession when compared with other professions.

IV. Since the 37 non-school states have provided the eleven schools with only 22.8 per cent of the freshmen in a five-year period (22 states not averaging one each year), and since these states contain 58.8 per cent of the veterinarians, it is clear that veterinary education needs stimulation in these states. The small enrollment in the present schools, as well as many other factors, indicates that the need is not for more schools. Also as nearly one-fourth of the students are from non-school states and are educated at the expense of the eleven school states, costing some of the states nearly $50,000 annually, some adjustment is needed. It is suggested that this Committee study, in coöperation with state organizations, and recommend such steps as may help remedy these two conditions, considering state-supported scholarships of real value and government or state aid for the schools and such other means as are suitable to the conditions met in the various states.

ACKNOWLEDGMENTS

The material comprising this report was collected and tabulated by the late Dr. H. E. Bemis, who served as chairman of the Committee, from the time that it was reorganized, in 1928, until his untimely death, April 4, 1931.

The other members of the Committee take this opportunity to acknowledge the vast amount of work done by Dr. Bemis in connection with the preparation of this report. They also desire to thank Mrs. Bemis for completing that portion of the report which remained unfinished when death interrupted the work.

Following the death of Dr. Bemis, Dr. N. S. Mayo, who had also been a member of the Committee since 1928, was appointed to the chairmanship by President Hall, and Dr. G. A. Dick, of Philadelphia, was appointed a member of the Committee for the unexpired portion of the term of Dr. Bemis.

A preliminary report on some of the phases of this investigation was made at Los Angeles, in 1930, and will be found in the proceedings of that meeting published in the JOURNAL, October, 1930, pp. 494-499.

Respectfully submitted,

N. S. MAYO, *Chairman* (1932)
G. A. DICK (1931)
REUBEN HILTY (1933)
C. D. MCGILVRAY (1934)
R. R. BIRCH (1935)

NEW ENGLAND VETERINARY MEDICAL ASSOCIATION

The second meeting of the New England Veterinary Medical Association was held at Burlington, Vermont, June 19-20, 1931. The meeting was held in combination with the College of Veterinary Surgeons of the Province of Quebec, and was considered, by those present, to be one of the best veterinary meetings ever held in the New England States.

On the morning of the first day, Dr. A. J. G. Hood, Superintendent, Food Inspection Service, Montreal, Canada, presented a paper on "Food Inspection." Dr. J. C. Flynn, of Kansas City, Mo., presented "The Corner Stone of Small-Animal Practice." Dr. R. W. Smith, state veterinarian of New Hampshire, covered "Common Diseases of the Dairy Cow."

The entire afternoon was devoted to a clinic. The operators included Dr. W. J. R. Fowler, of the Ontario Veterinary College; Dr. J. F. Devine, of Goshen, N. Y., and Dr. J. C. Flynn, of Kansas City, Mo. The evening program consisted of an informal banquet and dance, attended by about 200.

On the morning of the second day, Dr. R. L. Conklin, of Macdonald Agricultural College, Quebec, presented an illustrated lecture on "Genital Diseases." Dr. P. R. Baird, of Waterville, Maine, presented a paper, "Observations of the Profession by a General Practitioner." Dr. J. C. Flynn continued with "Diseases Common in Certain Breeds and Certain Ages of Small Animals," illustrated with motion pictures. Professor V. A. Rice, of Massachusetts State College, addressed the meeting on "Taking the Guess out of Breeding."

The clinic was continued in the afternoon. The papers presented were of a practical nature and contained a great deal of valuable information, while the clinics were equally instructive. All three operators are natural teachers and understand the problems of the private practitioner. The Local Committee on Arrangements did a fine piece of work in providing more clinical

material than the operators could handle in the time allotted for the clinical part of the program.

A short business session of the Association was held and by-laws for the newly formed organization were adopted.

H. W. JAKEMAN, *Secretary.*

MONTANA VETERINARY MEDICAL ASSOCIATION

The twenty-third annual meeting of the Montana Veterinary Medical Association was held at the Montana State College, at Bozeman, July 22-23, 1931. There was an attendance of 35 men, and the meeting was considered one of the most successful in the history of the Association.

We were very fortunate in having with us Dr. Maurice C. Hall, president of the A. V. M. A., and Dr. W. T. Johnson, poultry pathologist of Oregon State Agricultural College.

Dr. Hall addressed the Association on "The Veterinary Profession," giving an outline of his very comprehensive proposals for a policy for the veterinary profession of this country. Dr. Hall also discussed "The Internal Parasites of Sheep."

Dr. Johnson gave an illustrated lecture on "The Control of Important Poultry Diseases," and in connection with the clinic demonstrated diagnostic procedures and handling of the fowl.

Members of the staff of the Experiment Station made valuable contributions to the program. The opening address was made by Director F. B. Linfield, in which he traced the history of the Veterinary Department of the College and Station. Louis Vinke, head of the Department of Animal Husbandry, gave a very interesting discussion of "Variations Within Feeds," emphasizing the marked differences in the feeding value of grains and hay grown under different conditions. Mr. Vinke also showed the visiting veterinarians the live stock carried by the Animal Husbandry Department.

In order to promote further an understanding between the Experiment Station staff and the veterinarians, heads of several departments of the Station were invited to dinner with the members of the Association, and each one spoke briefly on some phase of his work which related to the work of the veterinarian.

Other speakers were Dr. C. A. Hatterscheid, the retiring President; Dr. D. M. Warren, of the Live Stock Sanitary Board Laboratory, who presented some observations on the use of acriflavine in the treatment of Bang's disease, and Dr. Hadleigh

Marsh, who reported on the progress of work of the Veterinary Research Laboratory.

The morning of the second day was devoted to practical demonstrations of various diagnostic procedures and methods of treatment of poultry, cattle, sheep and hogs.

Items of business which caused considerable discussion were the proposals of the A. V. M. A. Committee on Affiliation of State Associations with the A. V. M. A., and the report of a committee appointed at the last meeting to study the relations between College and Experiment Station veterinarians and the practitioners.

The officers elected for the next year were: Dr. I. W. Vinsel, Miles City, president; Dr. J. W. Murdoch, Helena, vice-president; and Dr. Hadleigh Marsh, Bozeman, secretary.

Helena was selected as the meeting place for 1932.

HADLEIGH MARSH, *Secretary.*

VETERINARY ASSOCIATION OF SASKATCHEWAN

The annual meeting and summer school of the Veterinary Association of Saskatchewan was held on July 22-23, 1931, in the live stock pavilion at the University of Saskatchewan, Saskatoon.

Considering the hard times, there was a good turn-out of members. Dr. T. H. Ferguson, of Lake Geneva, Wis., was in charge of the clinic. The morning of the first day was devoted to the annual business meeting and election of members of the council. The following is the complete list of officers and council for 1931-32: President, Dr. A. Chambers; vice-president, Dr. J. L. Millar; secretary-treasurer and registrar, Dr. Norman Wright. Council: Drs. A. Chambers, J. C. Millar, M. Barker, H. Richards, J. J. Murison and M. P. McClellan.

It was decided by unanimous vote of the meeting to raise the annual fee of all non-practitioner members who are engaged full time in any branch of veterinary science within the Province to $10.00, the same as practitioners, except men in the employ of the Health of Animals Branch of the Department of Agriculture, Ottawa.

A committee was appointed to deal with the question of affiliation with the A. V. M. A. under the proposed new organization, also with the question of the formation of a Dominion-wide Veterinary Association.

In the afternoon, Dr. T. H. Ferguson conducted the clinic. A cow was presented for rumenotomy. The animal was prepared and given epidural and local anaesthesia. During the operation, Dr. Ferguson gave a very fine demonstration of the method of exploring the abdominal cavity, especially the walls of the reticulum and the diaphragm behind the heart. The operation was successful, the animal making a good recovery.

Two registered Holstein cows were examined for sterility. Both animals had been acting very "bullish" and restless. They had been bred for six and seven months regularly, but had not conceived. There was no history of retained placenta and agglutination tests were negative in both cases. On examination, both animals were found to have cervicitis, with both ovaries cystic. The cysts were ruptured, the cervix irrigated with normal saline and then swabbed with gycerin and Lugol's solution, equal parts, phenol 10 per cent, with instructions to treat the ovaries and cervix in the same manner if the cows did conceive after the next breeding.

The second day was opened by Dr. Walter C. Murray, president of the University of Saskatchewan. In the course of his remarks, he showed a close knowledge of the requirements of veterinary education, and announced that the veterinary college which had been intended to start this fall would not be opened owing to financial conditions within the Province. When conditions became more nearly normal, the College would be opened. He also expressed the belief, with reserve, that the veterinary surgeon of the future would have to be more of a public health man than in the past, and his training stronger in the sciences. He warmly welcomed the members of the Association to the University and told them that the buildings and scientific staff were at their disposal at all times in the furtherance of their profession and their individual problems.

Professor J. S. Fulton, animal pathologist at the University, presented a paper on "*Brucella Abortus.*" As a result of the discussion following the paper, a resolution was passed, to be forwarded to the federal and provincial Departments of Agriculture, urging an increase in the efforts to control contagious abortion in animals, pledging the active support of the veterinary profession in Saskatchewan to this end.

A paper on "Acute Parturient Hypocalcaemia" was read, with a description of the apparatus and technic used, by Dr. Norman Wright, of the University of Saskatchewan. The paper called

forth considerable discussion, especially on apparatus and technic. Dr. Hewitt made the interesting statement that he used an ordinary hot-water bottle and tube with a hypodermic needle attached. The bottle and tube were easily sterilized by boiling while the calcium gluconate (Sandoz) was being dissolved, the strength of the solution being 100 cc in 2000 cc of sterile water, injected at five or six points. This avoided relapses from too small a dose and abscesses from too concentrated a solution.

The program also included a visit to Convocation Hall, to salute the Veterinary Memorial erected by the Association to its members who fell in the Great War.

The afternoon clinic was conducted by Dr. T. H. Ferguson. The first case presented was a cow, nearly due to calve, for a cesarean section. Sacral anaesthesia was used quite successfully. The calf was removed alive through the right flank. Both cow and calf did well. The next case was a cow with septic mammitis. The animal was given 20 cc of a two per cent solution of procaine in the spinal canal, between the last lumbar and the first sacral vertebrae, anaesthesia being complete. An ablation of the whole of the mammary gland was then performed. Dr. Ferguson described the operation step by step while doing it.

An important discussion took place during the meeting on the mass treatment of horses for bots, a number of animals having died as a result of the treatment. It was brought out in the course of the discussion that six horses had been treated experimentally with carbon disulphid in the standard doses and then destroyed. Not one of the stomachs was normal, all being damaged. One of them, at least, was beyond the hope of recovery.

The meeting was considered one of the most successful the Association has ever held.

NORMAN WRIGHT, *Registrar.*

CENTRAL PENNSYLVANIA VETERINARY CLUB

A meeting of the Central Pennsylvania Veterinary Club was held at the cottage of Dr. E. P. Althouse, south of Sunbury, Pa., August 20, 1931. Sixteen veterinarians were in attendance. Dr. C. J. Marshall, of the University of Pennsylvania, was the speaker of the afternoon and gave a very interesting and instructive talk on veterinary jurisprudence. Dr. H. R. Church, of Harrisburg, Pa., and Dr. F. A. Marshall, of Indiana, Pa., followed with a number of very interesting case reports.

Dr. Althouse proved to be a very fine host to the party and all those present expressed themselves as having had a very enjoyable afternoon.

B. Scott Fritz, *Reporter.*

SOUTHEAST GEORGIA VETERINARY ASSOCIATION

A meeting of the Southeast Georgia Veterinary Association was held at Waycross, Ga., September 12, 1931. The business session in the afternoon was devoted largely to discussion of preliminary plans for the sixty-ninth annual convention of the American Veterinary Medical Association, to be held in Atlanta in August, 1932. Preceding the business session, the veterinarians attended a pure-bred Hereford sale, sponsored by the Lions Club of Waycross, at which 24 bulls and 10 heifers were sold. A banquet in the evening concluded the program.

Hugh F. Arundel, *Secretary-Treasurer.*

SOUTHEAST KANSAS VETERINARY MEDICAL SOCIETY

A very enjoyable meeting of the Southeast Kansas Veterinary Medical Society was held at the Matthewson Hotel, Parsons, Kans., the evening of September 17, 1931. Following a dinner and musical program, the meeting was called to order by the President, Dr. Roy L. McConnell, of Coffeyville, Kans. A general discussion followed relative to the adoption of a constitution and by-laws for the Society.

Dr. L. H. Thurston, of Girard, Kans., presented a very unusual specimen of pulmonary tuberculosis which created considerable interest. The subject of parasites was then discussed and a committee was appointed to outline a plan for parasite control.

At future meetings it is planned to hold clinics for both large and small animals. The next meeting will be held some time in December at Iola, Kans.

Lee F. Barthelme, *Secretary.*

The licensing of stallions and jacks in California was discontinued, August 14, 1931, as a result of the repeal of the statute requiring licensing, enacted in 1911.

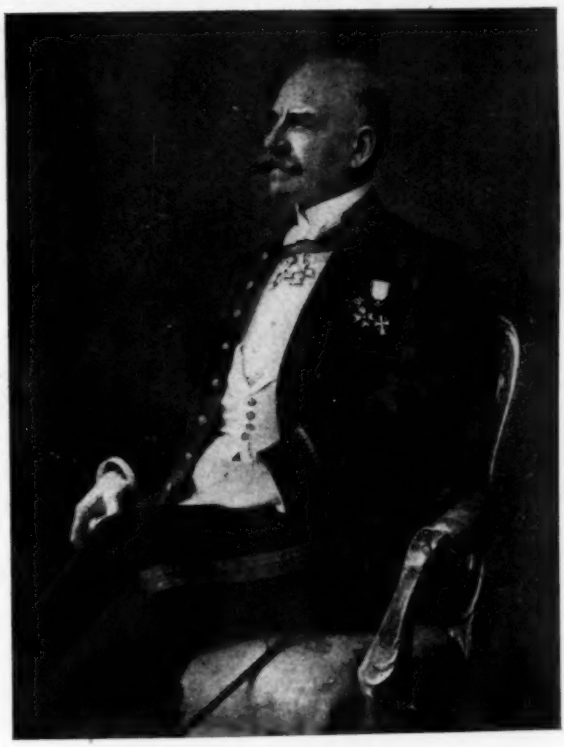
A man was fined one cent for shooting a cow, by an Athens, Tenn., judge recently. He was indicted under a law that had been on the books since 1803.

NECROLOGY

GUSTAF KJERRULF

Dr. Gustaf Kjerrulf, of Stockholm, Sweden, an honorary member of the A. V. M. A., died July 13, 1931.

Born in Presthylta, Dalams, Sweden, January 16, 1861, Dr. Kjerrulf was graduated from the Swedish Veterinary High School,



Dr. Gustaf Kjerrulf

in Stockholm, in 1885. Shortly afterwards he was made Assistant City Veterinarian in Stockholm, in charge of meat inspection.

In 1892 he was appointed City Veterinarian and in 1900 he became a member of the State Board of Health. In 1915 he was made Bureau Chief of Public Health, the highest office in the Swedish veterinary service. He resigned this office in 1928, when he reached the age of retirement.

Following the death of Professor Arvid Bergman, Dr. Kjerrulf assumed the editorship of *Skandinavisk Veterinar-Tidskrift*, a post he held until his death. Veterinary hygiene seemed to be Dr. Kjerrulf's main interest. For his work in veterinary medicine he was accorded several honors and decorations. He was an honorary member of several foreign scientific societies, member of the Swedish Medical Association and the Academy of Agriculture. The Swedish Veterinary Medical Association gave him its gold medal and the University of Uppsala conferred upon him the degree Doctor of Medicine (*causa honoris*) in 1907.

CAPTAIN RALPH H. LEWIS

Captain Ralph H. Lewis, V. C., U. S. A., died suddenly at Hyattsville, Md., August 15, 1931, while on leave of absence from his station, Fort Ringgold, Texas.

Born in Washington, D. C., February 19, 1893, Captain Lewis attended local and business high schools before entering George Washington University. He received his D. V. M. from the latter institution in 1917. He received his appointment as second lieutenant in the Veterinary Officers' Reserve Corps, May 15, 1917. He was honorably discharged on July 28, 1919, and reëntered the service as a second lieutenant in the Veterinary Corps of the regular army on January 23, 1922. He was graduated from the Army Veterinary School and the Medical Field Service School in 1917.

Captain Lewis joined the A. V. M. A. in 1929. He is survived by his widow and two children.

HENRY ELMO PINE

Dr. H. E. Pine, of Tempe, Arizona, died very suddenly September 3, 1931, following an attack of acute heart trouble shortly after he returned from his work in the field and had partaken of his mid-day meal.

Born at Campbell, Texas, June 29, 1877, Dr. Pine attended local schools. Following his graduation from high school, in 1894, he attended Henry College at Campbell, Texas, taking a

regular literary course and later attended Burleson College at Greenville, Texas, where he pursued a business course, which he finished in 1897. For a few years he was engaged in the livery business with his father, at Campbell, Texas. In 1903 he took over the business, on the death of his father. In 1905, he entered the Kansas City Veterinary College and was graduated with the class of 1908.

Immediately upon his graduation, Dr. Pine entered the service of the U. S. Bureau of Animal Industry and was assigned to the New Mexico field force at Albuquerque. He was stationed at Roswell, New Mexico. In 1909 he was transferred to Carrizozo, New Mexico, and remained at that point until 1920, when he was detailed to work in San Juan County, New Mexico, on eradication of sheep scabies on the Navajo Indian Reservation. He continued in this work for approximately eight years, after which he was assigned to the tuberculosis eradication work in Arizona, with headquarters at Tempe.

Dr. Pine joined the A. V. M. A. in 1910. He was a member of the National Association of B. A. I. Veterinarians. He is survived by his widow, one son and one daughter.

F. H. B.

MAJOR HOWARD N. BEEMAN

Major Howard N. Beeman, V. C., U. S. A., was accidently drowned in the New York River, at Yorktown, Va., September 4, 1931, while on leave of absence from his station, Front Royal, Va.

Born at Williamston, Mich., October 8, 1891, Major Beeman attended local schools and Michigan State College. He then entered Ohio State University and received his veterinary degree in 1913. He was appointed second lieutenant in the Veterinary Officers' Reserve Corps, June 30, 1917. He entered the regular army with the rank of first lieutenant on July 1, 1920. He was graduated from the Army Veterinary School in 1922, and from the Troop Officers' Course, the Cavalry School, in 1924.

Major Beeman joined the A. V. M. A. in 1918. He is survived by his widow.

WILLARD A. SAVAGE

Dr. Willard A. Savage, of Tucumcari, New Mexico, died on September 24, 1931. Although he had never said anything about it to his friends, it developed that Dr. Savage had been suffering,

for some months, with a heart affection which terminated suddenly, and without apparent warning, while he was on duty in the field.

Born on a farm in Hill County, Illinois, September 14, 1872, Dr. Savage attended local schools and in his younger days engaged in farming and stock-raising. In 1893, he served as a guard at the World's Fair in Chicago. In 1895, he was graduated from the Chicago Veterinary College, with the degree Doctor of Comparative Medicine.

For about three years, Dr. Savage engaged in general practice in Illinois. On October 1, 1898, he entered the service of the U.S. Bureau of Animal Industry and was first stationed at South Omaha, Nebr. From there he was transferred to Fremont, Nebr., and later to Chicago, Ill. Following a severe illness while in Chicago, he was transferred to the field force of the B. A. I. at Albuquerque, New Mexico, and for the first few years was stationed at Roswell, New Mexico, and Dalhart, Texas. Later on he was given the station at Tucumcari, New Mexico.

Dr. Savage joined the A. V. M. A. in 1910. He was a member of the National Association of B. A. I. Veterinarians. He leaves his widow and one daughter to mourn his loss.

F. H. B.

C. HENRY DOEPEL

Dr. C. Henry Doepel, of Mount Vernon, N. Y., died at the Brooklyn Naval Hospital, September 29, 1931.

Born in New York, N. Y., April 23, 1873, Dr. Doepel attended local schools and the American Veterinary College in New York City. He was graduated from the latter in 1893. He was attached to the Mount Vernon Fire Department, as veterinarian, from 1903 to 1921, and was an assistant state veterinarian from 1913 to 1917.

In August, 1917, Dr. Doepel was commissioned as first lieutenant in the Veterinary Corps of the U. S. Army and saw almost two years of service overseas with the 80th Division, 305th Engineers.

Dr. Doepel joined the A. V. M. A. in 1921 and was a member of the Hudson Valley Veterinary Medical Association. He was a member of the Foresters of America and was Chief Ranger in 1894. He was affiliated with the Veterans of Foreign Wars and the American Legion. He is survived by his widow and one son.

JAMES T. WRIGHT

Dr. James T. Wright, of Detroit, Mich., died in a local hospital, October 7, 1931. The immediate cause of death was diabetes.

Born July 30, 1900, at Saint Joseph, Missouri, Dr. Wright attended local schools and the Saint Joseph Veterinary College. Following his graduation in 1922, he was located at Pierre, S. Dak. At the time of his death he was connected with the poultry inspection service of the U. S. Bureau of Agricultural Economics. He had been engaged in this work since August 1, 1929.

Dr. Wright is survived by his widow, father, mother, one sister and one brother. Funeral services were held at Saint Joseph, Missouri, on October 10.

WILLIAM BURT

Dr. William Burt, of Simcoe, Ontario, died at his home, October 10, 1931, after a lengthy illness.

Born in Woodhouse Township, Norfolk County, Ontario, in 1850, he studied veterinary medicine at the Ontario Veterinary College. He was a member of the class of 1880. He practiced at Simcoe for many years and during this time held many municipal offices. He was a member of the Town Council for 14 years, reeve for seven years, trustee of the Board of Education for ten years and warden of Norfolk County in 1904.

Dr. Burt is survived by his widow, one son, Dr. A. C. Burt (Ont.'11), two sisters and one brother.

G. A. BOSTROM

Dr. G. A. Bostrom, of Thedford, Nebraska, died October 11, 1931, as the result of injuries received when he was hit by an automobile on the Lincoln Highway, six miles east of Columbus, Nebraska. He died without regaining consciousness. He was changing a tire on his car when the accident occurred.

Born at Marathon, Iowa, April 7, 1892, Dr. Bostrom attended local schools, the University of Nebraska, Kansas City Veterinary College and Chicago Veterinary College. He was graduated from the latter in 1920. He practiced first at Wahoo, Nebr., and later at Minden. At the time of his death Dr. Bostrom was in the employ of the U. S. Bureau of Animal Industry, working out of the Lincoln office, on tuberculosis eradication.

Dr. Bostrom joined the A. V. M. A. in 1921. He was a member of the Nebraska and Missouri Valley Veterinary Medical associations. He was a member of the Masonic order and the American Legion. He had two years of Army service to his credit. He is survived by his widow and one son.

JAMES F. REID

Dr. James F. Reid, of East Saint Louis, Ill., died suddenly, October 15, 1931, following a stroke. Although he had been in poor health for the past few years, he had been able to look after his various business interests.

Born in Tweed, Ontario, 68 years ago, a nephew of Sir MacKenzie Bowl, Premier of Ontario, he attended local schools and the Ontario Veterinary College. Following his graduation, in 1884, he located in Decatur, Ill. About thirty years ago, he removed to East Saint Louis and formed the firm of Campbell & Reid and Western Sales Stable Company, at the National Stockyards. Dr. Reid was president of the First National Bank of Lebanon, Ill., chairman of the Board of Directors of the First National Bank of East Saint Louis, and president of Robertson's Inc., a local mail order house.

Dr. Reid is survived by his widow, one son, two brothers and two sisters. The funeral was held at Decatur, Ill.

WILLIAM F. WISE

Dr. William F. Wise, of Medina, Ohio, died October 15, 1931, after an illness of several months.

Born on a farm near Wadsworth, Ohio, July 17, 1883, he moved to Barberton with his family while still a boy and attended high school there. He later took a business college course and then entered the Ontario Veterinary College. He was graduated in 1907 and returned to Barberton. Later he moved to Seville and more recently to Medina. In 1912 he took a postgraduate course at the University of Pennsylvania.

Dr. Wise joined the A. V. M. A. in 1912. He was a member of the Ohio State Veterinary Medical Association, the Medina County Agricultural Society and the National Grange. His fraternal affiliations included the Masons, Odd Fellows and Knights of Pythias. He was prominently connected with the Medina County Fair and frequently officiated as starter at fair races.

As chief of the Medina Fire Department Dr. Wise was instrumental in bringing about community fire prevention and fire control. His suggestions were adopted by many rural communities. In recognition of his work along fire prevention and control lines, Governor Myers Y. Cooper appointed Dr. Wise Deputy Fire Marshall and he became head of the Division of Fire Control.

Dr. Wise is survived by his widow, one son and one brother.

CHRISTMAS E. EVANS

Dr. C. E. Evans, of Racine, Wis., died at the Mayo Hospital, Rochester, Minn., October 22, 1931, following an operation about a week previously. He was a graduate of the American Veterinary College, class of 1883 and had been located in Racine ever since. He was one of the oldest graduate veterinarians in the Badger State at the time of his death. He joined the A. V. M. A. in 1911. He is survived by his widow, one daughter and one son, Dr. R. C. Evans (Chi. '15).

The death of Dr. Charles C. Brace, late president of the Denver Chemical Manufacturing Company, occurred August 26, 1931, according to an announcement of the Company.

PERSONALS

MARRIAGES

Dr. Roy E. Willie (St. Jos. '22) to Miss Elvera S. Erickson, both of Chicago, Ill., August 22, 1931, at Chicago, Ill.

Dr. Geo. A. Young (K. S. C. '12), of Syracuse, Nebr., to Miss Nell Armstrong, of Lincoln, Nebr., August 24, 1931.

Dr. Kenneth Ross (Ont. '27), of Detroit, Mich., to Miss Madge Armstrong, of Toronto, Ont., July 14, 1931, at Toronto, Ont.

Dr. Andrew Crawford (K. S. C. '30) and Miss Muriel Hallock, both of McComb, Miss., the latter part of July, 1931, at McComb, Miss.

Dr. Raymond H. Alexander (K. S. C. '20), of Harrisburg, Pa., to Miss Genevieve Long, of Haviland, Kans., September 2, 1931, at Haviland, Kans.

BIRTHS

To Dr. and Mrs. D. E. Davis, of Petaluma, Calif., a daughter, June 10, 1931.

To Dr. and Mrs. E. A. Tunnicliff, of Bozeman, Mont., a son, September 24, 1931.

To Dr. and Mrs. J. D. Shoeman, of Dallas Center, Iowa, a daughter, in August, 1931.

To Dr. and Mrs. C. R. Omer, of Marshalltown, Iowa, a son, Bobby Gene, August 22, 1931.

To Dr. and Mrs. O. K. Hoffman, of Hagerstown, Md., a daughter, Clara Faye, October 10, 1931.

To Dr. and Mrs. O. E. Walgren, of Platte Center, Nebr., a daughter, Betty Lucille, August 9, 1931.

PERSONALS

Dr. D. Lyddy (Iowa '31), of LaCrosse, Wis., has located at Richland Center, Wis.

Dr. V. W. Melvin (Cin. '15), of Toledo, Ohio, suffered a stroke of paralysis about a month ago.

Dr. R. C. Sutherland (T. H. '12), formerly located in San Diego, Calif., is now in Oceanside, Calif.

Dr. J. H. Woodside (Corn. '09) has removed from Redmond, Wash., to Newberg, Ore., Route 2.

Dr. A. J. Osteen (Ga. '28) has requested a change of address from Belhaven, N. C., to Greensboro, N. C.

Dr. Alfred W. Meyer (N. Y. U. '22) has removed from New York City to 70 Remsen St., Brooklyn, N. Y.

Dr. E. B. Simonds (U. S. C. V. S. '18) reports a change of address from Riverdale, Md., to Berwyn, Md.

Dr. Carl S. States (O. S. U. '31) has removed from Wilmington, Ohio, to Xenia, Ohio. Address: 320 W. Main St.

Dr. Charles C. Gluhm (O. S. U. '31), of Hamilton, Ohio, has removed to Lexington, Ky. Address: 617 Price Ave.

Dr. James Atterberry (Ind. '15), of Golden Gate, Ill., has purchased a practice at Albion, Ill., and removed there October 1.

Dr. W. P. Bossenberger (Chi. '13), formerly of Williams, Iowa, has removed to Webster City, Iowa. Address: 204 Des Moines St.

Dr. W. K. Kuester (McK. '16), who has been practicing at Ellsworth, Wis., for the past five years, has removed to Rice Lake, Wis.

Dr. Earl Kropf (O. S. U. '15), of Canton, Ohio, was recently called upon to perform an operation on Nimbo, a lion at the Canton Zoo.

Dr. S. H. Holloway (Ont. '29), of Winnipeg, Man., is taking postgraduate work in bacteriology and pathology at Ohio State University.

Dr. P. C. Guyselman (Colo. '12), formerly located at Fontana, Calif., reports a new address: 127 Base Line, San Bernardino, Calif.

Dr. W. W. Bailey (Iowa '29) has removed from Lincoln, Nebr., to Trenton, N. J. He is now with the New Jersey Bureau of Animal Industry.

Dr. C. J. Kershaw (Mich. '30), who assisted Dr. E. R. Steel (Corn. '14), of Kansas City, Mo., during the summer, has returned to Wyandotte, Mich.

Dr. Charles E. Palmer (Cin. '14), of Shelbyville, Ky., was recently elected secretary-treasurer of the Kentucky State Board of Veterinary Examiners.

Dr. H. E. Rea (Ont. '02), of West Branch, Mich., officiated as judge of horses at the Northeastern Michigan Free Fair, held at Bay City, in September.

Dr. C. L. Miller (O. S. U. '22), of Oak Park, Ill., has added a motor ambulance to the equipment used in connection with his Oak Park Animal Hispital.

Dr. H. F. Wilkins (K. C. V. C. '16), formerly located at Lewistown, Mont., has been transferred to Helena, as chief deputy state veterinarian for Montana.

Dr. George C. Moody (Ont. '85), of Mason, Mich., was reappointed Ingham County Veterinarian by the Board of Supervisors, at the October meeting.

Dr. W. E. Welsh (Iowa '27) has left the University of Wisconsin to accept a position in the Division of Veterinary Medicine, Iowa State College, Ames, Iowa.

Dr. J. T. Brown (K. C. V. C. '15), of Belleville, Ill., has been reappointed Saint Clair County Veterinarian, for another year, at a salary of $3,600.00 and expenses.

Dr. W. A. Axby (Ohio '95-Cin. '05), of Harrison, Ohio, addressed the Springfield, Ohio, Kiwanis Club, at a recent meeting, his subject being "The Present-Day Veterinarian."

Dr. Bruce Kester (O. S. U. '25), who was at Ohio State University pursuing postgraduate studies the past year, has returned to Dayton, Ohio. Address: 2624 E. Third Street.

Dr. William Madson (Chi. '11), of Appleton, Wis., is the owner of a four-year-old Belgian mare, weighing 2,250 pounds when in working trim and requiring a 25-inch collar.

Dr. Lloyd Jones (Iowa '31) has accepted the position as private veterinarian to the Passchendale Farms at Antioch, Ill. Dr. Jones will have a herd of 900 cattle under his direction.

Dr. Erwin E. Slatter (O. S. U. '30), who has been associated with Drs. Case and Planz, of Akron, Ohio, the past year, reports a change of address to Fremont, Ohio, Route 4.

Dr. W. N. Armstrong (Ont. '94), of Concord, Mich., is now without the office of Jackson County Veterinarian, this having been abolished by the Board of Supervisors, at the October meeting.

Dr. G. U. Marchand (Ont. '05), of Urichsville, Ohio, was accidently wounded by gunshot while hunting, the latter part of September. About forty shot were lodged in various parts of his body.

Dr. W. G. Moore (Gr. Rap. '17) has discontinued practice at Carlinville, Ill., and has removed to Edwardsville, Ill., to take over the practice of his brother, Dr. A. A. Moore (Gr. Rap. '12).

Dr. A. A. Moore (Gr. Rap. '12), of Edwardsville, Ill., has removed to Rockford, Ill., where he has taken over the small-animal hospital of Dr. J. C. Wilson, who is retiring and moving to California.

Dr. O. F. Butterfield (Chi. '96), formerly of Gibson City, Ill., has located at Tiskilwa, Ill., where he has taken over the practice of Dr. E. W. Newhalfen (McK. '18), who recently removed to Clinton, Iowa.

Dr. Leon Abrevaya (Corn. '29), whose appointment to a position in Venezuela was announced in the September issue of the JOURNAL, has been obliged to return to New York City, as the climate in South America did not agree with him.

Dr. H. M. Martin (U. P. '16), who has been with the Pennsylvania Bureau of Animal Industry, at Harrisburg, Pa., the past year, has joined the faculty of the School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa.

Dr. Ashe Lockhart (K. C. V. C. '15), of Kansas City, Mo., addressed the Professional Men's Club, of Kansas City, on "The Work of the Veterinarian," on September 1. He addressed the Kansas City Kiwanis Club on the same subject on September 14.

Dr. M. L. Plumer (U. P. '16), who has been with the New Jersey Bureau of Animal Industry for more than eight years, recently resigned his connection and has entered private practice at Newton, N. J. Dr. Plumer was formerly located at Branchville, N. J.

Dr. Reuben Hilty (O. S. U. '07), of Toledo, Ohio, attended the annual convention of the American Park Executives, at Toronto, Canada, the latter part of September. Dr. Hilty attended the meeting in his capacity of veterinarian to the Toledo Zoölogical Park.

Dr. E. A. Ehmer (Wash. '18), of Seattle, Wash., is making an extended tour of the United States, accompanied by Mrs. Ehmer. They left Seattle in September and expected to be gone several months. They were in Detroit on October 5 and at last reports were in Washington, D. C.

Dr. F. G. Caslick (Corn. '30), of Versailles, Ky., has reported a change of address to Glen Farm, Newport, R. I. Dr. Caslick has been in the employ of Senator Johnson N. Camden the past year. In his new location he will be employed as veterinarian on the estates of W. H. Vanderbilt and Mrs. Mose Taylor.

Dr. I. B. Boughton (O. S. U. '16), who was connected with the Service Technique, Port au Prince, Haiti, for a number of years, is now at Columbus, Ohio, taking postgraduate work in parasitology at Ohio State University. Dr. Boughton left Haiti October 3, all government services in Haiti, except financial and military, having been turned over to the Haitians on October 1.

BUREAU TRANSFERS

Dr. J. E. Peterman (St. Jos. '16) from Saint Joseph, Mo., to Columbus, Nebr., on hog-cholera control.

Dr. R. J. Spain (Gr. Rap. '18) from Saint Paul, Minn., to Reno, Nevada, on meat inspection.

Dr. C. W. Turrell (Ind. '18) from New Orleans, La., to New York, N. Y., on meat inspection.

Dr. H. P. Waddle (K. C. V. C. '10) from Clinton, N. C., to New York, N. Y., on meat inspection.

Dr. C. C. Robenstein (Colo. '20) from Craig, Colo., to Durango, Colo., on field inspection.

Dr. Melvin A. Ruck (O. S. U. '16) from Detroit, Mich., to South Kortright, N. Y., on meat inspection.

Dr. J. V. Ramler (K. C. V. C. '18) from Fergus Falls, Minn., to Albert Lea, Minn., on meat inspection.